PORT OF SEATTLE/
BURLINGTON ENVIRONMENTAL, INC.
TERMINAL 91 FACILITY
SEATTLE, WASHINGTON

FINAL RESOURCE CONSERVATION AND RECOVERY ACT FACILITY ASSESSMENT

TABLE OF CONTENTS

LIST OF FIGURES
(AT END OF TEXT)

LIST OF TABLES

APPENDICES

ACRONYMS AND ABBREVIATIONS

AOC	Areas of Concern
API	American Petroleum Institute
BEI	Burlington Environmental, Inc.
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CHEMPRO	Chemical Processors, Inc.
CITY ICE	City Ice and Cold Storage Company
DAS	Distribution Auto Services
ECOLOGY	Washington Department of Ecology
EPA	U.S. Environmental Protection Agency
PANOCO	Pacific Northern Oil Company
PCB	Polychlorinated Biphenyls
PRC	Environmental Management, Inc.
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SVOC	Semi-Volatile Organic Chemicals
SWMU	Solid Waste Management Unit
TPH	Total Petroleum Hydrocarbon
UST	Underground Storage Tank
VOC	Volatile Organic Compounds
VSI	Visual Site Inspection

1.0 INTRODUCTION

PRC Environmental Management, Inc. (PRC) assisted in preparing this Resource Conservation and Recovery Act (RCRA) facility assessment (RFA) to support U.S. Environmental Protection Agency (EPA) enforcement of RCRA. PRC was asked to assist in conducting this RFA at Terminal 91 in Seattle, Washington, to complement the draft RFA (Tetra Tech 1988) prepared only for the Chemical Processors, Inc. (Chempro) Pier 91 hazardous waste facility in 1988. Chempro became Burlington Environmental, Inc. (BEI) in 1991. The corrective action requirements specify that EPA assess all contiguous property under the same ownership. Since the Port of Seattle owns the Terminal 91 property and leases portions of the terminal to a variety of businesses that includes BEI, an RFA is required for all of Terminal 91, not just the BEI portion of the property. In other words, the scope of the RFA had to be expanded from the 1988 draft RFA to property beyond BEI's leased premises.

EPA requested PRC to investigate portions of Terminal 91 not assessed during the 1988 RFA process and only update the earlier Tetra Tech, Inc. (1988) RFA information into a new RFA report. This report presents the file review and site investigation findings. No recommendations have been included in this report regarding the need for further investigation at SWMUs and AOCs. The 1988 RFA is included as Appendix A of this report.

An RFA represents a first step in the process for implementing the corrective action provisions of the 1984 Hazardous and Solid Waste Amendments to RCRA. Specifically, RCRA sections 3004(u), 3004(v), and 3008(h) grant EPA the authority to require corrective action for releases of hazardous waste and hazardous constituents from solid waste management units (SWMU) at RCRA-regulated facilities.

An RFA usually consists of three steps: a preliminary review, a visual site inspection (VSI), and if needed, a sampling visit. The purpose of these steps is to:

- Identify and gather information on releases of hazardous wastes and constituents at the RCRA facility
- Identify SWMUs and areas of concern (AOC) at the facility and evaluate them for releases of hazardous wastes
- Screen from further investigation those SWMUs that do not pose a threat to human health or the environment.

1.1 Preliminary Review

The preliminary review was conducted in accordance with procedures outlined in the EPA (1986) RFA guidance document.

Files were reviewed at the offices of EPA Region 10, Seattle, Washington, and the Washington Department of Ecology (Ecology), Bellevue, Washington. Information was also obtained from the Port of Seattle in response to a request from EPA. Because a draft RFA had already been completed on the BEI facility, PRC did not review files pertaining to that facility. At the request of the EPA work assignment manager, PRC incorporated information on the BEI site from the following documents into this report:

- *Draft Report RCRA Facility Assessment, Chemical Processors, Inc., Pier 91, Seattle, Washington, (Tetra Tech 1988)*
- *Chemical Processors, Inc., Pier 91 Facility, Solid Waste Management Unit Report, (Chempro 1988)*
- BEI response to EPA SWMU information request (BEI 1992)

1.2 Visual Site Inspection

During the October 20 and 21, 1992, VSI, all areas of interest specified in the preliminary review report were examined. A trip report is included as Appendix F to this report.

The following individuals participated in the visual site inspection:

Dave Croxton, EPA Region 10
Noushin Arab, PRC
Gwen Herron, PRC
Galen Tritt, Ecology, Northwest Regional Office
John Stiller, BEI
Ron Atwood, BEI
Nathan Matthews, BEI
Mike Brandeberry, BEI (first day only)
Julie Slocum, BEI
Doug Hotchkiss, Port of Seattle
Tom Newlin, Port of Seattle (first day only)
Sue Roth, Kennedy/Jenks Consultants
Marlys Palumbo, BEI (first day only)
George Markwood, Pacific Northern Oil Company (first day only)

2.0 FACILITY DESCRIPTION

This section describes the location, past and present operations, hazardous waste management practices, and regulatory history of Terminal 91.

2.1 Location

The Port of Seattle's Terminal 91 property is approximately 124 acres and includes Piers 90 and 91. Terminal 91 is located at the north end of Elliott Bay at 2001 West Garfield, west of 15th Avenue in the Interbay area between the Queen Anne and Magnolia neighborhoods in Seattle, Washington. The general site location is shown on Figure 1.

2.2 Site History

Detailed information on property owners and property users (lessees) prior to the Port of Seattle and BEI are contained in searches prepared for the Port of Seattle (Converse 1993a) and for BEI (Sweet-Edwards/Emcon Inc. 1990). Information on owners and operators is also available in PANOCO's comments to the interim Final RFA (Converse 1993b). According to the title searches, Terminal 91 has had numerous owners and operators over the years. Oil companies mostly controlled the site from the 1920's until World War II when ownership was transferred to the U.S. Navy. The U.S. Navy later transferred final ownership to the Port of Seattle in the mid-1970's.

The Port of Seattle currently leases portions of Terminal 91 to BEI, City Ice and Cold Storage Company (City Ice), and Distribution Auto Services (DAS). BEI leases approximately 4 acres from the Port of Seattle. In turn, BEI subleases approximately 60 percent of its area to the Pacific Northern Oil Company (PANOCO). BEI operates a hazardous waste storage and treatment facility (WAD 00081 2917) at Terminal 91. Some site history and information on past practices of these current operators is summarized in Sections 2.2.1. through 2.2.5.

2.2.1 Burlington Environmental, Inc. (BEI) Facility

BEI has leased it's 4-acre site from the Port of Seattle beginning in 1971. The BEI facility had been leased and operated under the name of Chempro from 1971 until the fall of 1991, when the facility name was changed to Burlington Environmental, Inc.

BEI subleases approximately 60 percent of its Terminal 91 complex to PANOCO for use as a marine fuel depot. In fact, much of the oil treated and recovered by BEI is sold to PANOCO. The BEI Pier

91 facility was granted interim status in 1980 and received a state-authorized RCRA permit effective August 1992. BEI's operations consist of transporting, storing, and treating solid and hazardous waste from off-site generators. Hazardous waste is not disposed of at this facility.

Wastes treated by BEI since 1971 include (Tetra Tech 1988):

- Dirty, oily bilge water
- Pretreated oily wastes from other BEI facilities
- Oily industrial wastewater
- Spent industrial coolants (phenolic and non-phenolic)
- Waste machine oil from local automotive shops

BEI generates hazardous waste sludges from thermal, chemical, and physical treatment of waste oil and oily wastewater. The sludges may contain significant concentrations of toxicity characteristic constituents (e.g., lead and chromium) and volatile organic compounds associated with petroleum products (Tetra Tech 1988). The waste sludge is transferred to the Lucille Street BEI facility in Seattle for final management (Tetra Tech 1988).

The 1988 RFA identifies one RCRA-regulated unit and 16 other SWMUs at the BEI Terminal 91 facility (Appendix A). The SWMUs are listed in Section 4.0 of this report. During the VSI, additional SWMUs were identified and are also discussed in Section 4.0. Information on BEI SWMUs identified since the 1988 draft RFA (Tetra Tech 1988) has been primarily gathered from two reports submitted by BEI in 1988 and 1992.

The 1988 BEI report lists units closed before and during BEI operations. Units that closed before 1971 when BEI (then Chempro) leased the site are listed below and are discussed further in Sections 4.0 and 5.0.

- Building 17 SWMU 26
- Tanks 340 and 341 AOC 12
- Tank 1530 AOC 13
- Tanks 119 through 126 AOC 14
- Tanks 7 and 8 SWMU # 27
- Oil barrel drain pit AOC # 15

- Oil barrel tumbler pit AOC # 15

SWMUs decommissioned during the BEI operation are (Chempro 1988):

- Tank 118 swmu 15
- Wastewater treatment tanks (two) swmu # 21
- Coolant treatment tank swmu #13
- Treated wastewater tank swmu # 23

Tank 118 and the coolant treatment tank are identified in the 1988 draft BEI RFA; the wastewater treatment tanks and wastewater tanks are discussed in Section 4.0. No information was found in the files to document releases from these SWMUs before June 1971 when BEI operations began (Chempro 1988).

Section 5.0 discusses known releases to the environment before and during BEI operations gathered from the Chempro 1988 report. Undocumented possible releases to the environment before and during BEI operations are also discussed in Section 5.0.

Tanks currently operated by BEI include numbers 94, 96, 97, 98, 100, 105, 107, 109 through 112, 114 (Figure 6), and 164 (located between Tanks 108 and 110). During 1988 and 1989, all BEI tanks were emptied, washed, and inspected for possible certification for RCRA use. Residuals and debris from emptying and cleaning were managed as Ecology-designated dangerous waste (WT02) (BEI 1992a). These tanks are used to hold a variety of wastes from waste oil, oily water, emulsified oil, boiler condensate, return water, and asphalteen (BEI 1992). All of these tanks except Tank 164 are described in the 1988 Tetra Tech, Inc. RFA (Appendix A). Upon approved upgrading for leak detection, tanks 105, 107, 109 through 112, and 164 are certified for RCRA service.

2.2.2 Pacific Northern Oil Company Facility (PANOCO)

BEI subleases approximately 60 percent of the Terminal 91 treatment and storage complex to PANOCO for use as a marine fuel depot. Since 1981, tanks 91, 93, 95, 99, 101 through 104, and 113 have been operated by PANOCO. Tanks 90 and 92 have been operated by PANOCO since 1992. These tanks are used to store product oil (Markwood 1992). From 1974 through 1981, BEI was the operator of these tanks under a throughput agreement with PANOCO (Port of Seattle 1993). Since 1981, PANOCO has operated these tanks. Also, there is some conflicting information regarding the operational control of Tank 106 (BEI 1993 and Converse 1993). It appears that while tank 106 manages water from PANOCO's boiler, there is no formal lease agreement with BEI regarding PANOCO's use of this tank.

In Section 4.2, EPA reviews SWMUs 26-30, associated with PANOCO. Please note that air releases from product tanks do not meet the definition of solid waste as defined in 40 CFR 261.2 and therefore can not be considered as SWMUs.

Petroleum product has been released from PANOCO equipment on several occasions, some of which have contributed to the formation of SWMUs. The spills discussed immediately below in this section are not listed as SWMUs or AOCs, since cleanup was conducted and confirmation samples did not indicate the presence of contaminants at levels above the cleanup standards.

On August 26, 1990, PANOCO discovered a rupture in a bunker C transfer line near the center of Pier 91 (Figure 2). This fuel line was replaced, and approximately 80 cubic yards of contaminated soil were excavated. A small amount of contaminated soil below the valve box (about 1.5 cubic yards) could not be removed because of the potential for structural damage to the valve box and transfer line (Converse 1990). The contaminated soil was transported to an asphalt plant in Tacoma, Washington. Grab samples collected from the excavation side walls and bottom indicated the presence of total petroleum hydrocarbon (TPH) concentrations below the Ecology cleanup standards of 200 ppm (Converse 1990a).

On May 14, 1991, PANOCO personnel discovered another rupture in a bunker C transfer line near the south end of Pier 91 (Figure 2). PANOCO estimated a release of approximately 30 to 60 gallons to the underlying soil (Converse 1991). The fuel line was replaced, and approximately 40 to 50 cubic yards of petroleum-contaminated soil were removed (Ecology 1991). Confirmation soil samples were collected from the excavated area. No TPHs were present in the analyzed samples (Converse 1991).

2.2.3 City Ice and Cold Storage Company (City Ice)

City Ice and Cold Storage Company operates at Terminal 91 and also subleases portions of the Terminal 91 property. Buildings M-28, W-39, W-390, B-391, B-392, W-40, and W-47 are used by City Ice or their subleases (Figure 3). City Ice subleases space in buildings M-28, B-392, and W-40 to Arctic Alaska and Independent Packers for frozen fish processing and cold storage.

There are three SWMUs associated with City Ice that are reviewed in Section 4.3. There are also several events of record that did not result in the determination of a SWMU, but which are discussed below because they are relevant to the assessment.

Warehouse W-47, which was leased by City Ice to various occupants, has been demolished and removed since the VSI was conducted. The northern half of the warehouse was used by City

Ice largely for the storage of fish meal. The southern half of warehouse W-47 was subleased by Pacific Rim Consultants, a steel fabrication company. During the VSI, Pacific Rim Consultants employees were seen welding steel. Along the outside wall of this facility, metal containers of red oxide primer were observed. A Pacific Rim Consultants employee stated that this facility no longer primed steel at this location after the fire department ordered this facility to stop using primers because of the associated fire hazard. However, freshly primed steel beams were clearly visible behind a paint curtain at this facility (Croxton 1992). During a December 4, 1992 follow-up site visit to Terminal 91, the Pacific Rim Consultants were no longer in operation at this location.

Expansion of the City Ice warehouse and fish processing facility near Building W-39 required a geotechnical investigation of the site. Sampling results indicated significant hydrocarbon contamination. Samples collected on June 23, 1987, from one of the monitoring wells installed at the proposed expansion area indicated 900 ppm of hydrocarbon vapors (Geo Engineers 1987). Water samples collected on August 19, 1987, indicated the presence of petroleum hydrocarbons, diesel fuel, benzene, and ortho-xylene (GeoEngineers 1987). No cleanup activities were conducted at this location (Hotchkiss 1992a). This contamination could be associated with a number of units in this area (See discussion on SWMU#2, SWMU#22, AOC#2, and AOC#13)

Port of Seattle records indicate that a citation was issued to City Ice for a minor ammonia release and reported oil spill on July 24, 1987 (Port of Seattle 1987b). Port of Seattle states that the "reported oil spill" resulted from the ammonia/water mixture being discharged under pressure onto the treated timber and pilings beneath the dock resulting in washing accumulated scums and surface creosote off the wood and into the Bay (Port of Seattle 1993). The ammonia release is not listed as a SWMU or an AOC, since it was a one-time spill that was discharged to Elliott Bay and immediately diluted. The City Ice facility uses ammonia receivers as part of their refrigeration systems in the frozen food storage warehouses.

2.2.4 Distribution Auto Services (DAS)

Property leased by DAS is used primarily to process and store imported automobiles. Four SWMUs are identified in conjunction with DAS, these are discussed in Section 4.4. DAS activities are discussed more fully below.

DAS uses the short fill area (SWMU #38), located next to Lake Jacobs to park cars and trucks once they are unloaded from ships. DAS also leases property at the north end of Terminal 91 to wash, apply protective coatings, repair, paint, and install additional

items in vehicles. Outside, west of Building W-158 on the paved lot, is an automobile spray system that consists of an inverted U-shaped pipe through which water is pumped. Building W-158 is the car wash station. In one half of Building W-158, DAS employees remove expired aquacoating from vehicles with detergent. Aquacoating is a protective coating that must be removed and reapplied every 90 days. In the second half of Building W-158, new aquacoating is applied (Section 4.4.2).

Automobile accessories such as alarms and compact disc players are installed in Building C-154. Minor vehicle maintenance, largely oil changes, also takes place in this building. Building C-155 houses two paint booths (Section 4.4.4).

Also on the DAS-leased area are a number of underground storage tanks (UST) (T-91-A through T-91-G) as shown on Figure 3. These tanks are discussed in Section 5.0.

2.2.5 Miscellaneous Site Information

At the time of the VSI, Building W-48 was leased from the Port of Seattle by several organizations. Since the VSI, this building has been demolished and removed. The northern half of the building was used entirely by Commercial Crating Inc., a wooden crate construction company. Much of the interior of this area was not inspected because access was denied by the operator. A flammable storage area was noted outside the building, however, and is discussed in Section 4.3.2. The southern end of the warehouse is used as a miscellaneous storage area for organizations that range from Seafair to Wald Imports. No storage of waste was observed, although the Seafair area contained roughly 30 clean and empty drums.

A number of transformers were seen during the VSI. Some of the transformers have been tested for polychlorinated biphenyl (PCB) content (Hotchkiss 1992a); however, analytical results of these tests were not available at the time of compilation of this report. These transformers may or may not contain PCBs. Transformers were seen outside buildings C-155 and W-47 and are further discussed in Section 4.0. Port of Seattle states that all of the old PCB transformers at Terminal 91 have been removed or changed-out (Port of Seattle 1993).

Several (USTs) are located on the Terminal 91 site and are shown on Figure 3 as "fuel tanks" numbered T-91H through T-91O. These USTs are discussed in Section 5.0.

2.3 Regulatory History

Although the Port of Seattle owns Terminal 91, separate and distinct operators run portions of the facility. The Port of Seattle received hazardous waste identification number WAD 98098 2706 for generating wastes such as PCB transformers, fluids, rinsates from barge cleaning operations, as well as miscellaneous rags and cleaning material that are disposed of off site (Port of Seattle 1986). BEI originally notified EPA of its hazardous waste activities in August 1980 and received identification number WAD 00081 2917. BEI submitted a RCRA Part A application for interim status in 1980. In November 1988, BEI submitted a RCRA Part B permit application and received a state-authorized permit in July 1992, effective August 26, 1992. PANOCO (WAD 98176 0762) operates only as a generator of ignitable waste. City Ice does not have an EPA identification number, nor do any of its subleases. DAS has filed notice as a hazardous waste generator and received identification number WAD 98066 5004.

The Puget Sound Air Pollution Control Agency (PSAPCA) has issued over 10 violations to the BEI Terminal 91 facility since 1976. All of these violations have been the result of stack emissions from PANOCO's boiler (Tetra Tech 1988). PSAPCA inspection records do not specify any emissions originating from BEI processes (Tetra Tech 1988).

Under RCRA, the BEI facility has been required to investigate for the presence of environmental contamination in accordance with two EPA orders. A RCRA Section 3013 order was issued June 30, 1988 to determine whether a release occurred from the facility to the environment. After the results of this study confirmed releases, a RCRA Section 3008(h) order was issued on May 7, 1990 to provide for the performance of a RCRA facility investigation (RFI). The BEI facility has also been subject to RCRA inspections of their operating facility on a regular basis.

3.0 ENVIRONMENTAL SETTING

Terminal 91 is located in a commercial and industrial area in close proximity to the Queen Anne and Magnolia neighborhoods. The nearest residence is within one-fourth mile northwest of the site. The nearest recreational area is also about one-fourth mile. Magnolia School is approximately one-half mile northwest of the site (Figure 1). Access to Terminal 91 is well controlled by fencing and security guards.

3.1 Meteorology

The climate in Seattle, Washington, is predominantly controlled by marine influences, characterized by cool, dry summers and

mild, wet winters. The average daily temperatures range from 35°F in January to near 70°F in July and August. Annual precipitation is approximately 35 inches (Tetra Tech 1988). The predominant winds are from the south-southwest.

3.2 Geology and Hydrogeology

The 1988 draft RFA report for BEI (Tetra Tech 1988) describes the site geology and hydrogeology as follows.

The Terminal 91 industrial complex is underlain by anthropogenic deposits of unsorted and unstratified material. This material consists of clay, silt, sand, and gravel originating from dredgings from Elliott Bay and regrading activities in King County, Washington. The majority of the pier construction occurred in the early 1900s. The man-made fill material ranges from 0 to approximately 60 feet in thickness and is underlain by quaternary tidal flat deposits of clay, silt, and sand.

The hydrogeology of the Terminal 91 area is poorly understood. The fill material is generally poorly sorted. Because of the man-made deposition, well-defined stratification of the material into laterally continuous layers is unlikely. The well logs from the nearby monitoring wells indicate a significant amount of sand and gravel overlying the quaternary tidal deposits. The coarse nature of the material probably produces a relatively high permeability. The fill material most likely behaves as a tidally influenced, unconfined aquifer. Further hydrogeologic tests would be necessary to fully characterize the Terminal 91 vicinity.

Investigations conducted by BEI provide more detailed information since the 1988 draft RFA, regarding hydrogeologic conditions beneath the BEI facility. The RCRA Facility Investigation (RFI) Workplan (BEI 1992b) summarized site hydrology thusly:

> 1) Subsurface soils appear to be man-placed fill overlying in-situ and reworked glacial deposits. These subsurface soils consist of silt, silty sand, and gravelly sand.
>
> 2) Three hydrostratigraphic units, corresponding to three geologic units, have been delineated beneath the facility.
>
> > a) The water table aquifer, which is approximately 20 feet thick, has a horizontal flow to the southwest with a hydraulic conductivity of 10-4 to 10-2 centimeter per second (cm/s). This unit appears to consist of fill with discontinuous layering of silt and coarse sand.

b) The middle unit, believed to be an aquitard, consists of silty sand. The silty sand extends from about 20 feet below the ground surface to a depth of 30 to 45 feet.

c) The deepest unit has a roughly south-southeast flow with a hydraulic conductivity on the order of 10-2.

The groundwater information collected by BEI suggests that the groundwater flow is to the south-southwest towards Elliott Bay.

The RFI at BEI has found widespread contamination of the soil and groundwater resulting from the industrial operations at this facility. BTEX (benzene, toluene, ethylbenzene, and xylene), chlorinated hydrocarbons, and polynuclear aromatic hydrocarbons have been detected in almost every soil boring on site [Figure 4]. Some of these same constituents are also present in the groundwater. BTEX compounds were detected in all of the borings in both the shallow and deep aquifers.

The full extent of contamination is still being investigated under an approved RFI work plan. BEI identified eight potential source areas for evaluation in their work plan (Figure 5). BEI's RFI Report was submitted in October 1993 and was under EPA review at the time of this writing.

During the VSI, the inspection team observed the remains of an aborted drilling attempt at well 122A. Drilling was halted when a wide hole (approximately 6 feet by 6 feet) under the paved lot was discovered. Current theory regarding the creation of the void space is that an underground water leak eroded the soil under the pavement. This well has since been installed at a slightly different location.

3.3 Surface Water

Surface waters in the vicinity of Terminal 91 include Elliott Bay, which forms the southern boundary of the property. In addition to Elliott Bay, there is a pond (approximately 400' by 250') named Lake Jacobs. Lake Jacobs is situated south of the Garfield Street viaduct. There are no permanent streams or rivers in the immediate vicinity of Terminal 91 and no surface water at Terminal 91 is used as drinking water. On-site storm water at the BEI facility is collected in tanks, visually inspected, and treated if necessary before it is discharged to the METRO sewer system (PRC 1992). Storm waters from other areas of Terminal 91 are directly discharged to Elliott Bay.

3.4 Receptors

Releases of hazardous constituents from the activities at Terminal 91 could affect on-site employees, aquatic biota, and, to a much lesser extent, terrestrial biota. The number of human and animal receptors is limited by fencing which surrounds the site. On-site employees could be exposed to contaminants through direct dermal contact with hazardous constituents and through inhalation of hazardous vapors. Nearby residents are potential receptors to air emissions from the site, and there have been many complaints from nearby residents about odors believed to emanate from Terminal 91.

Groundwater in this vicinity is not currently used for drinking water. There is a deep production well on-site that has been evaluated by the City of Seattle as a potential future source of drinking water. Groundwater, which discharges to Elliott Bay and Lake Jacobs, could transport contaminants to these surface water bodies. Aquatic fauna would be exposed to any contaminants present through ambient contact with surface water, ingestion of contaminated plants or prey, and respiration through the gills. Aquatic plants would be exposed through ambient contact with contaminated sediments and water. Terrestrial fauna may be exposed through ingestion of contaminated surface water. Water fowl exist on Lake Jacobs throughout the year and could be exposed to contaminants at this location. Additionally, since Elliott Bay is used for recreation (e.g., boating, fishing, and scuba diving), there is potential for human receptor exposure in Elliot Bay.

Soil exposure routes for terrestrial biota include dermal contact and ingestion of contaminated soil for animals, and uptake through the root system and absorption through the leaves for plants. While these scenarios are possible, ecological impacts in industrial areas are difficult to ascertain and are probably limited, especially at Terminal 91 where virtually the entire site is paved.

4.0 SOLID WASTE MANAGEMENT UNITS

SWMUs operated by BEI, PANOCO, City Ice, and DAS are discussed in Sections 4.1, 4.2, 4.3, and 4.4, respectively. Section 4.5 identifies SWMUs at Terminal 91 not specifically operated by these entities. All of these SWMUs are located on the Port of Seattle Terminal 91 property. Forty-six SWMUs have been identified at Terminal 91. Photos taken during the VSI are included as Appendix B to this report.

4.1 Solid Waste Management Units at BEI

The 1988 draft RFA for BEI included as Appendix A (Tetra Tech 1988) lists 17 SWMUs (Figure 6). These previously identified SWMUs are discussed in Section 4.1.1. Additional SWMUs identified during preliminary review and the VSI for this final RFA are discussed in Sections 4.1.2 through 4.1.9.

Since the 1988 draft RFA, BEI has received a RCRA operating permit. Due to physical reconfiguration of the tank farm space and changes in the operating practices for managing hazardous waste at BEI, the regulated hazardous waste management area under the RCRA permit is much smaller than the original interim status area. The current regulated unit area consists of a subset of the tanks from the original Small Yard tank farm. Because the tanks and area of the Small Yard are covered in this RFA as SWMUs, a separate SWMU has not been created for the RCRA permitted regulated waste management unit. In other words, assessment of the RCRA permitted regulated unit is subsumed by a combination of other SWMUs.

The 1988 draft RFA only examined SWMUs on the BEI leased property and does not distinguish between PANOCO or BEI operations. Therefore, updates to SWMU information contained in the 1988 RFA for both PANOCO and BEI operations are included under this section.

4.1.1 Previously Identified SWMUs at BEI

The 1988 draft RFA (Tetra Tech, 1988) identifies 17 SWMUs which are included in this final RFA. Updated information obtained since the draft RFA report for SWMUs 1, 2, 3, 5, 12, 13, 14, 15, and 17 are included below in this section (Section 4.1.1). All other information on these SWMUs is available in the draft 1988 report included here as Appendix A.

The 17 SWMUs from the draft 1988 RFA incorporated into this final RFA are as follows:

SWMU 1	-	Hazardous Waste Container Storage Area in Building 19
SWMU 2	-	Oil/water separator
SWMU 3	-	Oily wastewater storage/treatment area
SWMU 4	-	Former Oily wastewater storage/treatment tank 90
SWMU 5	-	Sludge dewatering/storage tanks
SWMU 6	-	Sludge decanter/centrifuge
SWMU 7	-	Final water storage tank
SWMU 8	-	Storm water sump system
SWMU 9	-	Pipe alley drainage
SWMU 10	-	Waste oil treatment tanks

SWMU 11	-	Oil blending tank
SWMU 12	-	Waste coolant storage tanks - NFA
SWMU 13	-	Waste coolant treatment tank
SWMU 14	-	Receiving tank (former coolant tank)
SWMU 15	-	Waste coolant slop/residue tank
SWMU 16	-	Sample storage area
SWMU 17	-	Waste oil spill area

Appendix A includes the description, waste characteristics, migration pathways, evidence of release, and exposure potential information for each of these SWMUs (Tetra Tech 1988).

SWMU 1, the hazardous waste container storage area inside building 19, is no longer used for hazardous waste and is planned for closure. As discussed earlier in this section, the permitted regulated waste management unit at BEI is an area reconfigured from the Small Yard tank farm. The RCRA permitted tanks are formerly numbered tanks 105, 107, 109, 110, 111, and 112.

SWMUs 2, 5, and 12 were decommissioned at the BEI facility after July 5, 1988 (BEI 1992a).

SWMU 2, the oil/water separator, was in operation from 1926 until 1990 (BEI 1992a). This 41,450-gallon unit was used to separate oily wastewater and oil (exempt for reuse or recycling), and consisted of a concrete vault. This vault was removed from service, washed-out, covered, and secured in February 1992. No information on known releases from the oil/water separator to the environment was available (BEI 1992a); however, this unit is a likely potential source of the soil and groundwater contamination that is well documented in this vicinity. Soil investigation during the RFI at BEI indicated that the highest concentrations of benzene, toluene, ethylbenzene, and xylene (BTEX) compounds were detected near the oil/water separator (BEI 1992b). Contamination evidence in this vicinity is also described in a GeoEngineer's report (GeoEngineers 1987) for a building expansion in this area and in the discussions of SWMU#2, SWMU#22, AOC#2, and AOC#13. An Interim Measures Workplan is under development to remove a light non-aqueous phase liquid (LNAPL) layer present in this vicinity. Release potential from this SWMU to the soil and groundwater is high. Release potential to air and surface water is low.

Archive drawings of Terminal 91 indicate that the bottoms of tanks 96 through 100 of **SWMU 3**, the Oily Wastewater Storage/Treatment Area, as well as the bottoms of tanks 102 and 104, were replaced in the mid-1950s (Figure 6) (Chempro 1988). Drawings indicate that these tanks were underlain with approximately 1.5 inches of oiled sand on a 2.5-inch concrete base. During the tank bottom replacement, an additional 4 inches of oil-saturated sand was placed under these tanks. Drawings indicate the oil was possibly sulfur-free, grade number 4 or 5,

and asphalt-based. The potential for waste oil migration to soil and groundwater is high at this location.

The 1988 Tetra Tech, Inc. RFA indicates that tank 108 (part of **SWMU 5**) was used for sludge dewatering and storage. This tank has reportedly been out of service possibly since 1988 or 1989, when it was emptied and washed-out (BEI 1992a).

SWMU 9, the pipe alley, was reported at one time by Port of Seattle investigators to be flooded (Port of Seattle 1974). Oily residue was visible and stairs and walkways were slippery from spilled oil. Oil was reported to have seeped out of the tank farm and into the storm sewer that discharged to Elliot Bay. In addition, Port of Seattle records indicate that the ground in this area was saturated with oily sludge. No specific source for this contamination was suggested (Port of Seattle 1974). Release potential from this SWMU to the soil and groundwater is high. Release potential to the air and surface water is low.

SWMU 12, the waste coolant storage tanks, were originally identified in the 1988 Tetra Tech, Inc. RFA as tanks 115, 116, and 117, which were reportedly active at that time. These tanks are now reportedly out of service, possibly since 1988 or 1989, when the tanks were emptied and washed-out (BEI 1992a).

SWMU 13, waste coolant treatment tank 165. The 1988 Tetra Tech, Inc. RFA describes this tank as an active unit; however, BEI later reported this tank as having been washed-out and removed from service in 1988 (BEI 1992a).

SWMU 14, Rec Tank (called the "Coolant Treatment Tank" in Chempro 1988). This tank was operated from 1980 until March 1988 when it was washed-out and scrapped. The tank was aboveground, rectangular, and open-topped. Its capacity is reported as 4,500 gallons. From 1980-1984 the tank was located outside the south warehouse wall. From 1984-1988 the tank was relocated fifteen feet to the southwest so that it was just outside the Small Tank Yard. In its first year, the tank was used to heat drums of asphalt/tar. After early 1981, the tank was used to treat and demulsify coolant oil and, occasionally, to treat phenol wastes.

SWMU 15, tank 118, was reported as active in the 1988 Tetra Tech, Inc. RFA. BEI reported (Chempro 1988) that Tank 118 was inactive as of July 1988. However, Tank 118 was later activated as BEI reported that Tank 118 did manage dangerous waste after July 1988, but that it has now been washed-out and is out of service (BEI 1992a).

SWMU 17, waste oil spill area, includes some spills not specifically discussed in the 1988 draft RFA. Because these spills occurred in adjoining tank yards, the tank yards were not paved until 1986, and contamination resulting from the spills is

expected to be intermixed and indistinguishable, the spills in this area have been combined together under SWMU #17. These spills are discussed below.

An estimated 420,000 gallons of high-pour oil from Tank 94 was released on November 15, 1978 onto the unpaved ground in the BEI facility (PANOCO, 1993). Fuel was released when a valve was left open during fuel transfer to two other tanks. There is some discrepancy about where this release occurred. Both PANOCO's comments (Converse Consultants 1993) and BEI's 1988 SWMU report (Chempro 1988) state that the 420,000 gallon release occurred from Tank 91, but spilled over into an area that included both the Black Oil Yard and the Marine Diesel Oil Yard. However, BEI states in their RFA comments (BEI 1993) that the spill occurred from Tank 94. For the purposes of corrective action, suffice it to say that in 1978, a 420,000 gallon spill of high pour oil occurred in the southeastern portion of the BEI facility. Approximately one third of the spilled fuel was recovered in 1979. To recover the remaining oil, BEI dug holes in the area, let spilled oil seep in, and pumped it out. Soil was rototilled in mid-1979, then drain tile and crushed rock were added to the yards. BEI's cleanup activities were completed by late 1979 or early 1980.

Another oil spill occurred July 5, 1980, from Tank 94 during a tank transfer (Chempro 1988). Between 63,000 to 113,400 gallons of oil were released to the Marine Diesel Oil Yard. This area was unpaved, gravel-covered, and within a diked yard. Soil piles in the yard, possibly from the spill, were removed in 1986 and 1987. Analytical results from soil pile sampling in July 1986 indicated that the soil was RCRA nonhazardous (Chempro 1988). A review of the analytical results indicates that the removed soils were contaminated with up to 8 ppm of PCBs.

In 1987, pits in the black oil yard were uncovered around tanks 90, 91, and 92 (Figure 6) (Chempro 1988). Hoses and other cleanup debris were observed in these pits, which had previously been covered with plants and soil. These pits may be from Navy operations or from the November 1978 oil spill at this area.

The tank system yard was fully paved in 1986 (Chempro 1988). The presence of contamination in downgradient wells are potentially sourced from these spills. The potential of soil and groundwater contamination at this location is high.

Nine additional SWMUs have been identified at BEI facility since the draft BEI RFA report (Tetra Tech 1988). These SWMUs are described below.

4.1.2 SWMU 18 - TANK 164

This steel tank, installed in 1988, has been used for storage and treatment of dangerous waste and is certified for RCRA service (BEI 1992a). It is identified in the state RCRA permit as Tank 2313. This tank is currently used by BEI for treatment of aqueous wastes such as oily water, wastewater, and machine coolants. The tank is an elevated, 14,000-gallon conical bottom tank (photograph 1), located in the small yard between tanks 108 and 110 (Figure 6). This single-wall tank is inspected daily for leaks, as well as annually for corrosion. The residual oil after treatment is processed at the BEI Georgetown facility in Seattle, Washington. The treated water is discharged to The Municipality of Metropolitan Seattle sewer system after being tested for Ph, metals, fats, oil, and grease content (Matthews 1992).

Wastes Managed

Wastes managed at this location include oily water, residual oil, wastewater, and machine coolants. These wastes may contain metals, methyl ethyl ketone, 1,1,1-trichloroethane, methylene chloride, and other volatile organic compounds (VOC) and semivolatile organic compounds (SVOC).

Release Controls and History of Release

This tank is sealed and is located within secondary containment (a concrete wall around the tank). The tank is single walled and inspected daily for leaks and annually for corrosion (Matthews 1992). There is no documentation nor currently visible evidence of releases from this SWMU. The tank has a vapor recovery system to capture releases of VOCs and other vapors and return them to the tank. The tank appears to be in good condition.

Release Potential and Rationale

The potential for release from this tank is low. The tank is within a secondary containment wall, appears to be in good condition, and is inspected daily.

4.1.3 SWMU 19 - SEWER RECONNECTION

During sewer reconnection in 1987, at the northeast portion of the BEI facility near the old barrel cleaning station (building 17), volatile petroleum hydrocarbon odor was noted (Port of Seattle 1992). BEI representatives collected and analyzed soil samples at this location (photograph 2) and BTEX contamination was found (Port of Seattle 1992). This area is identified as number 3.2 on Figure 5. The potential sources of this release were considered to be gasoline storage tanker fuel transfer lines or from former operations on-site (Hotchkiss 1992a). This area is now paved and outside the retaining wall of the RCRA-regulated storage and treatment area.

Wastes Managed
Hydrocarbon odors and high levels of BTEX found in the soil were considered likely to be the result of releases from fuel transfer lines.

Release Controls and History of Releases
This area is covered with concrete, and the contaminated soil remains in place. No cleanup activities were conducted.

Release Potential and Rationale
Since contaminants have already been released into the soil, the potential for contaminant releases from this SWMU to groundwater is high. The area is paved, however, making the potential for contaminant release to air and surface water low.

4.1.4 SWMU 20 - AMERICAN PETROLEUM INSTITUTE GRAVITY SEPARATOR

The American Petroleum Institute (API) separator is sealed and is stored near Building 127, just east of the RCRA-regulated storage and treatment area of the BEI premises (photograph 3). This oil/water separator was installed in 1979, and cleaned-out and removed from service in 1986 (Mathews 1992). The API separator is a steel-constructed tank and is located on a concrete pad with no secondary containment. During the VSI, a small oily area was noted on the ground below the drainage pipe.

Wastes Managed
The API separator was used to treat oily wastewater. No analytical results of these wastes are available.

Release Controls and History of Releases
The API separator is a steel-constructed tank, placed on concrete. There is no secondary containment. A small oily stain was observed on the ground below the drainage pipe. No other staining was visible.

Release Potential and Rationale
The likelihood of contaminant release to soil and groundwater is low since the area is paved. The potential for contaminant release to air and surface water is moderate because of evidence of release; however, the oily stain was small and did not extend beyond the area immediately beneath the drainage pipe.

4.1.5 SWMU 21 - WASTEWATER TREATMENT TANKS

Two, open-top wastewater treatment tanks (6,000 and 8,000 gallons) were in operation by BEI from 1979 to 1982. The tanks were presumed to be steel and plastic frame with a vinyl liner (Chempro 1988). The aerial photographic analysis (EPA 1993)

confirmed that the building containing the waste water treatment tanks, Building 23 (See Figure 7), was a waste water treatment building. The waste water treatment building was present in the 1963 and 1977 aerial photographs, but removed by 1983. These aboveground tanks were used to treat emulsified wastewater and wastewater with low levels of chromium and phenolic compounds received from tanker trucks. These tanks were removed from the site and were sent to an off-site disposal facility (Chempro 1988). The location of this SWMU is shown on Figure 7.

Wastes Managed
Wastes managed in these tanks include emulsified wastewater and wastewater contaminated with low levels of chromium and phenolic compounds (Chempro 1988).

Release Controls and History of Release
BEI states that these open-top tanks were on concrete pads (BEI 1993); however, the general area was not paved. After the building was removed, the aerial photographic analysis clearly indicates a large stained area originating in the vicinity of the foundation of the removed building and extending northward to the Distribution Auto Services parking lot. There is no other information on release controls or history of releases for these tanks.

Release Potential and Rationale
The potential for release to soil and groundwater from the tanks in the area is moderate because there is evidence of heavy staining in this vicinity from the aerial photographic analysis. Release potentials to air and surface water are low.

4.1.6. SWMU 22 - SLUDGE PILE

An area of sludge storage at the north end of the waste water treatment building, building 23, was identified in the aerial photographic analysis (EPA 1993). The pile was present in 1977 and appears to be approximately 50' by 50'. The pile was removed by 1985.

Wastes Managed
This SWMU stored sludge wastes, most probably from the waste water treatment process.

Release Controls and History of Release
There is no information on release controls other than the fact that one area of the sludge storage was fenced. The sludge pile is uncovered and this area was not paved at the time of the operation of the wastewater treatment system. The 1985 aerial photograph indicates heavy staining along the eastern edge of the former waste water treatment building and running northward to

the DAS parking lot. The location of the former sludge pile is now covered by City Ice Building W-39.

Release Potential and Rationale
The sludge pile was uncovered and uncontained, and after the pile was removed, photographic evidence indicates heavy soil staining in this area. This situation creates a high potential for soil contamination and a moderate potential for groundwater contamination.

4.1.7 SWMU 23 - TREATED WASTEWATER TANK

This 4,800-gallon tank was open-topped, rectangular, and constructed of steel. It was used by BEI for flocculation and gravity separation of wastewaters. This tank was in operation from 1984 until 1988, when it was washed-out and scrapped (Chempro 1988). The tank was located next to SWMU 14, just outside the northern wall of the Small Tank Yard. Figure 7 shows the location of this SWMU.

Wastes Managed
The primary waste managed at this SWMU was wastewater requiring clarification. No analytical data on this waste are available, but it may have contained metals and phenolic compounds.

Release Controls and History of Releases
There is no information on the history of releases for this SWMU. BEI stated that the tank was on a concrete pad (BEI 1993).

Release Potential and Rationale
Because the past condition of this SWMU is not known, the potential for contamination from this SWMU is not predictable.

4.1.8 SWMU 24 - CONTAMINATED AREA AT RAILROAD

An area of contamination at the northeast corner of the BEI facility was noted in the early 1970s. This SWMU is shown on Figure 3 as 3.1. A probable source of the contamination is sludge waste. Sludge was reportedly routinely disposed of by BEI personnel on the railroad tracks and in sludge ponds (Port of Seattle 1992). Soil samples collected from this location indicated the presence of organic solvents about 3 to 5 feet below the paved surface (Port of Seattle 1987a).

Wastes Managed
Sludge is the primary waste reportedly disposed of at this location. Soil sample analysis indicated the presence of toluene, ethylbenzene, and total xylenes at 1,700, 7,800, and 22,000 parts per million, respectively (Port of Seattle 1987a).

Release Controls and History of Releases
This area is now paved. There were no known release controls at this location. No action has been taken to clean up this area (Hotchkiss 1992a).

Release Potential and Rationale
Contaminated soil already exists at this location. The potential for contaminant release to groundwater is high. Since the area is paved, the potential of contaminant release to air and surface water is low.

4.1.9 SWMU 25 - TRACKS WEST OF BUILDING 19

Several spills have been reported from the railroad tracks that ran southward, just west of Building 19. Approximately 6,000 to 10,000 gallons of bunker fuel were released to asphalt and soil west of Building 19 (Figure 7), in December 1987 or January 1988 (Chempro 1988 and PANOCO 1993). This release was caused by a steam pump hose breaking from a rail car valve during unloading. The bunker fuel was released to soil and into catch basins in the immediate vicinity. To clean up the spill, the released oil was pumped to an on-site tank, residue was removed with shovels and absorbent materials, and the contaminated area was cleaned with detergent and steam cleaners (Chempro 1988). There are no soil sampling data available to verify that the contamination was limited to the removed residue. BEI stated that the catch basins were blind (BEI 1993), and PANOCO stated that the catch basins were part of BEI's drain system, which is then processed by BEI's oil/water separator. PANOCO further stated that the recovered material went into BEI's tank system and the wastewater was discharged to Metro per BEI's permit (Converse Consultants, Inc. 1993).

Another spill is reported in the Chempro 1988 SWMU report. A spill of high-pour oil occurred December 17, 1984, at the railroad tracks when an internal valve on a rail car froze. Released material was reportedly vacuumed-up and the spill area scraped, cleaned with detergent, and steam cleaned. PANOCO stated that the spill was restricted to asphalt, and 100 percent cleanup was obtained. Liability of the spill was asserted against Sinclair, who bore the expense of the cleanup. The cleanup was performed by Crowley Environmental (Converse Consultants 1993). No sampling data are available to confirm degree of clean-up obtained.

A third spill of 500 gallons of asphalt product occurred in August 1989 when a hose separated from a rail car during unloading. BEI reports that the material was confined to the immediate area and the spill cleaned-up (BEI 1992a).

Wastes Managed
Bunker fuel, potentially containing metals, VOCs, and SVOCs, was released into the soil at this location. High pour oil and asphalt have also been released to this area.

Release Control and History of Releases
There have been three recorded spills in this area, all of which were responded to with clean-up actions. No release controls existed at this area and the area was mostly unpaved. Port of Seattle states that this area was not bermed at the time of this release (Port of Seattle 1993). No soil sampling data are available to confirm that releases were limited to the removed materials.

Release Potential and Rationale
Release of contaminants were observed in the soil (Chempro 1988). Contaminants were recovered, but no sampling data are available to indicate the release was limited to the recovered residue. Since no confirmation results are available, potential of soil and groundwater contamination is considered moderate at this location. Potential of contaminant release to air and surface water is low because of the age of the spill, and the area is now paved.

4.10 SWMU 26 - BUILDING 17

This metal building, on the northeast edge of BEI's leased premises, was in use from 1926 to 1977 for drum cleaning, but the specific wastes managed there and the processes used in this building are unknown. Port of Seattle states that this building was operational under BEI (Port of Seattle 1993). The building was approximately 100 feet by 25 feet and located along the northeastern edge of the BEI leased property (Figure 7). This building was dismantled in 1977 (Chempro 1988).

Wastes Managed
Exact wastes managed at this unit are unknown; however, the building was used for cleaning drums and the adjacent tank systems were used for petroleum refining in the 1920's and for oil storage and reclamation since the 1940's.

Release Controls and History of Releases
The building was metal and in approximately 1950 had a roof extension added. There is no information about release controls or history of releases.

Release Potential and Rationale
Insufficient information exists to reasonably determine a release potential from this SWMU.

4.11 SWMU 27 - TANKS 7 AND 8

These 1,200-gallon steel aboveground tanks were in operation from 1944 to 1971 (Figure 7). These tanks were located in Building 19, the warehouse. The tanks managed lube oil. A small lube oil centrifuge was formerly located adjacent to the tanks. In the mid to late 1970's the centrifuge, along with tank piping, fittings, and valves were disconnected and removed (Chempro 1988).

Wastes Managed
Tanks 7 and 8 were used to clean lube oil and remove water.

Release Controls and History of Releases
There is no documentation of releases at this AOC or information regarding release controls.

Release Potential and Rationale
Insufficient information exists to reasonably determine a release potential from this SWMU.

4.2 SOLID WASTE MANAGEMENT UNITS AT PANOCO

The following SWMUs, associated with PANOCO operations, were identified during the VSI and through the review of EPA and Ecology files.

4.2.1 SWMU 28 - CONCRETE BERMS

Three concrete berms, located against the walls of the Marine Diesel Yard at the PANOCO facility, were observed to contain oily rainwater (photograph 5). This area is inactive and was used in the past to store contaminated soil excavated from an oil spill. BEI stated that the spill was from a 1983 PANOCO spill at Berth C (BEI 1993). PANOCO stated that they were responsible for the spill, but that the source of the spill is a 4,800-gallon release from Tank 91. The contaminated soil was removed, and the concrete berms were cleaned out in 1990 (PRC 1992). Rainwater collected in the berms is periodically pumped out to PANOCO's tank farm.

Wastes Managed
Oily contaminated soil was previously stored at this location, but was removed in 1990. Rainwater collected in the concrete berms appeared to be oily. The exact composition of this waste is unknown, but likely includes VOCs and SVOCs associated with petroleum products.

Release Controls and History of Releases
Contaminated soil was stored inside the concrete berms, which are currently partially filled with storm water. Other than the oily appearance of the pooled water, there is no visible evidence of release from this location.

Release Potential and Rationale
The area is paved with concrete and surrounded by concrete berms. The integrity of the concrete pavement and berms could not be determined because they were not inspected closely. The potential for contaminant release to the soil, groundwater, surface water, and air pathways is low to moderate because the berms were cleaned out in 1990.

4.2.2 SWMU 29 - BUILDING 127

Building 127 is used as the boiler fuel feed manifold and distribution center (photograph 6). Fuel is pumped from tank 113, south of building 127, to the warehouse boiler northwest of building 127 in the main warehouse (building 19). During the VSI an open drum containing waste oil and water and oily rags was seen inside this building. Water mixed with boiler fuel had accumulated in the large catch basin that runs beneath the pipelines in the building that feed the boiler. During the VSI it was difficult to determine the condition of the catch basin because of the presence of wastewater and boiler fuel in the basin. This standing liquid appeared to be approximately 8 inches deep. This building is an active unit. The unit began operations in 1926.

Wastes Managed
Waste oil (from boiler fuel) that is released from the manifold is accumulated in the catch basin. Waste oil and water and oily rags are collected in an open 55-gallon drum. The exact composition of these wastes is unknown, but likely includes VOCs, SVOCs, and metals.

Release Controls and History of Releases
Oil pipelines are located over a concrete catch basin. The integrity of this catch basin could not be determined during the VSI, but it appeared to be very old, similar to the age of the building. The 55-gallon open drum containing waste oil and water was uncovered and stored on a concrete floor without secondary containment. If the catch basin or the drum were to leak, soil and groundwater would be potential pathways of concern. There is no documentation of releases from this location.

Release Potential and Rationale
The integrity of the catch basin could not be determined during the VSI. Since the basin is filled with an oily wastewater, any crack in the catch basin would allow leakage to the soil and

groundwater. A drum was uncovered and placed on a concrete floor without secondary containment. There is a potential for oil spills from the drum. The likelihood of release to the soil and groundwater pathway is moderate because of the age of the building and the possibility for cracks in the catch basin. Potential of contaminant release to surface water is low. The likelihood of release to the air is moderate since the drum and the oily wastewater in the catch basin were not covered.

4.2.3 SWMU 30 - PIPELINE LEAK

The pipeline leak is located south of the West Garfield Street guard shack entrance and west of Lake Jacobs (Figure 8). The leak was first observed in 1989 as a product sheen on Lake Jacobs (Hart-Crowser 1989, Converse Consultants, Inc. 1990b). One monitoring well in this area, MW-3, had measurable floating product, ranging in thickness from 0.24 to 0.69 feet. A product sheen observed on Lake Jacobs near MW-3, was thought to be product seeping through cracks in the Lake Jacobs retaining wall (Converse 1990b). It was estimated that between 340 to 1,370 gallons of product were released into the area around MW-3 (Converse 1990b). Other wells in the vicinity of MW-3, are MW-102, MW-11, MW-6, and MW-2 (Figure 8).

During excavation of a portion of the pipeline, just east of MW-11, a thin 0.01-foot product layer was encountered on the water table. Soil samples collected from this area confirmed presence of diesel. No VOCs or SVOCs were detected (Hart Crowser 1989). The exact source of the leak was never identified (Hart Crowser 1989). PANOCO ceased using the suspected pipeline and now believes they have controlled the problem. A groundwater pumping system and liquid hydrocarbon recovery system (SWMU 29) was installed in 1990 to recover the released product. During a January 1994 facility tour, the pump and treat system was not operating. The adequacy of the recovery system is under review by EPA.

Wastes Managed
Waste managed at this location was diesel fuel.

Release Controls and History of Release
Floating product was observed on Lake Jacobs in 1989. Isolated oil sheens on Lake Jacobs are often visible, but could be the result of run-off into the lake. Soil and groundwater samples indicated the presence of diesel fuel in this area. The suspected pipeline is no longer used. A recovery system was installed in 1990 to recover release product (see SWMU 29).

Release Potential and Rationale
Sampling confirmed the presence of diesel fuel in soils and groundwater, and floating product was also observed on Lake

Jacobs. Potential of contaminant release to soil, groundwater, and surface water is high because of observed release and positive sampling results. Potential of contaminant release to air is low. The leak appeared approximately 4 years ago and has since believed to be controlled. The current state of contamination from the pipeline leak is not known.

4.2.4 SWMU 31 - LIQUID HYDROCARBON RECOVERY SYSTEM AND WASTE OIL DRUMS

Because of the release discussed in SWMU #28, above, floating product in wells west of Lake Jacobs, a liquid hydrocarbon recovery system (photograph 7) was installed for remediation of what is believed to be a pipeline leak (see SWMU 29). The recovery system is an all-pneumatic system with a total fluids pump installed in a 6-inch-diameter extraction well (EW-1) and a 2-inch-diameter monitoring well (MW-3) (Figure 6) (Converse 1992a). Recovered liquid hydrocarbons are separated from water with a Quantek coalescing plate oil/water separator (Converse 1992a) that discharges groundwater effluent to the Municipality of Metropolitan Seattle sanitary sewer system under permit No. 7597 (Converse 1992a). The separated phase is stored in a double-walled product storage tank (Converse 1990b). This permit requires effluent monitoring for priority pollutant metals, VOCs, SVOCs, fats, oil, grease, cyanide, Ph, temperature, soluble sulfide, and atmospheric sulfide. The recovered waste oil is stored on site in 55-gallon drums (Converse 1992a), which are kept on a bermed concrete floor (PRC 1992). This unit was believed to be active at the time of the VSI, but was not in operation during a site tour in January 1994.

Wastes Managed

Oil-contaminated water and waste oil are the primary wastes managed at this location. These wastes may contain metals, VOCs, and SVOCs associated with petroleum products.

Release Controls and History of Releases

Diesel fuel was released to the water table before the hydrocarbon recovery unit was installed (Converse 1992a). The liquid hydrocarbon recovery system intake lines are equipped with floats designed to maintain the intake at the top of the air/liquid hydrocarbon interface. The 55-gallon drum and the hydrocarbon recovery unit are placed on a bermed concrete floor behind a wire fence. There is no documentation of release from the hydrocarbon recovery system, nor any visual evidence of a release.

Release Potential and Rationale

The potential for release from this unit to all media is low. The recovery system and drums are placed within secondary containment and appear to be in good condition.

4.2.5 SWMU 32 - OIL BLENDING STATION

The PANOCO-operated oil blending station is located on the southern end of Pier 91. Fuel is blended to requested specifications (photograph 8). This unit is constructed of steel with a catch basin that drains into a blind sump located beneath the unit. This area is covered with a roof, but is open on the sides. Since oil was accumulated in the catch basin and sump, the integrity of the catch basin and sump could not be determined during the VSI. The oily waste from the sump is pumped out by PANOCO and treated by BEI as needed (PRC 1992).

Wastes Managed
Waste oil resulting from oil blending is the primary waste managed at this location; its exact composition is unknown, but likely includes metals, VOCs, and SVOCs associated with petroleum products.

Release Controls and History of Release
Release controls at this station consist of a roof cover and a catch basin beneath the oil blending station, which in turn drains into a sump. During the VSI, an oily sheen was noticed on the pavement on one side of the oil blending station. Groundwater, surface water, and soil are potential pathways of concern in the event of cracking or leaking from the sump and the catch basin. Pipelines from the oil blending station are tested hydrostatically every 6 months for leak (Markwood 1992). There is no documentation of past releases from this location.

Release Potential and Rationale
No information on the integrity of the sump is available. The likelihood of release to the groundwater, surface water, and soil pathways is considered moderate because of the unknown integrity of the catch basin and sump. Because the blending station is located out on the pier, the distance to Elliot Bay is short. Air potential release is low.

4.3 SOLID WASTE MANAGEMENT UNITS AT CITY ICE

This section describes City Ice SWMUs identified during the VSI and the file review.

4.3.1 SWMU 33 - SOLID WASTE YARD

The aerial photographic analysis for 1977 revealed two large, adjacent, former solid waste yards. The yards were located just west of the northern half of the BEI facility and extend to the north for approximately 300 yards to about the current southern boundary of the DAS leased property. These yards were at the former location of two triple bay warehouses that ran north-south

on the property. The yards were serviced by three railroad spurs and several vehicular access ways. At the time of the 1977 aerial photograph, a scrapper and front loader were operating at the yard. The eastern yard was fully fenced and the western yard was partially fenced. The photographic analysis revealed that in the eastern yard, solid waste was stacked up against fencing along both sides of the yard and there was a shallow covering of solid waste over the rest of the yard. The western yard had solid waste mostly stacked up against the northern perimeter of the yard with lesser amounts of scrap visible in other portions. Areas of probable sludge waste were also present. By the time of the 1985 photograph, the solid waste yard had been paved and converted to a DAS parking lot.

Wastes Managed
Solid wastes, including scrap and probable sludge from the waste water treatment building, were managed in the yard.

Release Controls and History of Release
A part of the yard was fenced, but no other release controls were evidenced by the aerial photographic analysis. The area was not paved. No information on history of releases was found.

Release Potential and Rationale
Release potential to the soil and groundwater is moderate from this yard since solid wastes were stored directly on the ground surface in the yard. Release potential to the air and surface water is low.

4.3.2 SWMU 34 - WASTE REFRIGERATION OIL TANK

Spent refrigeration oil is generated at Buildings W-39, W-40, W-390, M-28, B-391, and B-392 (Figure 3), which are leased by City Ice from the Port of Seattle. Approximately 300 gallons of waste oil from the cooling systems are generated every 2 years from all of these buildings (Suelzle 1992). This waste oil results from small releases collected in open 5-gallon buckets (photograph 9), located on a concrete floor with no secondary containment, and from routine system maintenance (photograph 10). The waste oil is periodically emptied into a metal tank stored on the concrete floor inside of the maintenance area (photograph 11). This tank appeared to be slightly rusty although it was in adequate condition. The waste oil is picked up and reprocessed by United Drain Oil of Seattle, Washington (Suelzle 1992).

Wastes Managed
Wastes managed at this location include waste oil resulting from routine refrigeration maintenance and small releases. The exact composition of these wastes are unknown, but likely contains metals, ammonia, VOCs, and SVOCs.

Release Controls and History of Releases
The waste oil is collected in buckets and stored in an old tank. There is no secondary containment in place for either the buckets or the tank, but the entire area is paved. There is no documentation of release from this waste management unit and no release evidence was visible during the VSI.

Release Potential and Rationale
Potential contamination of groundwater, surface water, and soils from the buckets is low since they are placed on a concrete floor inside the building. There is a potential for spills from the buckets. The potential of contaminant release from the uncovered buckets to the air is moderate. The tank appeared to be rusty, but not leaking. Release potential from the tank is low to all media.

4.3.3 SWMU 35 - STORAGE AREA OUTSIDE BUILDING W-47

Building W-47, leased by City Ice, was on the western most portion of the Port of Seattle/Terminal 91 property (Figure 3). City Ice subleased portions of the storage area to various small operators. This building has been demolished and removed since the time of the VSI. Sixteen 55-gallon drums were seen outside building W-47 (photograph 12) at the VSI. Some of the drums appeared to be empty, and the labels of others indicated that they contained paint wastes. In addition, one old refrigeration unit (photograph 13), one 55-gallon drum labeled "transformer oil" (photograph 14), one 15-foot-tall bin with unknown contents (photograph 15), twelve 55-gallon drums labeled concrete curing (photograph 16) secured behind wire fencing, and a number of propane tanks were seen at this location. This area was covered with a roof. The drums were stored on wooden pallets.

Wastes Managed
As indicated by the labels on the 55-gallon drums, paint wastes, transformer oil that may contain PCBs, and concrete curing compounds are stored in these drums. In addition, an old refrigeration unit, which may still contain refrigeration oil or refrigerant, and a number of propane tanks were stored at this location. It is unclear whether the transformer oil and concrete curing compounds are wastes.

Release Controls and History of Releases
The 55-gallon drums were stored on wooden pallets with no secondary containment other than asphalt flooring. This is covered with a roof. There is no documented information of releases at this location, nor was any evidence of releases observed during the VSI here.

Release Potential and Rationale

Drums had no secondary containment, but appeared to be in good condition. The potential for release of paint wastes, transformer oil, concrete curing compounds, and refrigeration oil to all media is low. The potential for release of propane to the air is moderate because of the unknown tank conditions. The potential for release of propane to all other media is low.

4.3.4 SWMU 36 - STORAGE INSIDE BUILDING W-47

Building W-47 was leased from the Port of Seattle by City Ice. Since the time of the VSI, this building has been demolished and removed. Areas of building W-47 were subleased by City Ice to various fishing boat companies and small manufacturing industries.

The northern portion of the warehouse was operated by City Ice, and was used for storage of fish meal and chemical waste containers. The northeast portion of this area was unlit and dark during the VSI; however, in faint sunlight the following items were observed inside building W-47: eight 55-gallon drums of motor oil (photograph 17); twenty-five 1-gallon containers of mineral acid (photograph 18), which had released some material to the adjacent paved ground (photograph 19); three 5-gallon drums of mineral thinner (photograph 20) labeled "Danger - Combustible"; a number of 55-gallon drums with unknown content (photographs 21 through 24); one transformer with an open drip pan that contained an oily liquid (possibly transformer oil) (photograph 25); a 5-gallon bucket of kerosene (photograph 26); a container of fiberglass compound (photograph 27); a 5-gallon container of resin solution labeled "flammable liquid" (photograph 28); a number of 5-gallon buckets with unknown content (photograph 29); and a number of miscellaneous wastes such as ropes and cardboard boxes (photographs 30 and 31).

The transformer, drums, and buckets were placed on top of wooden pallets. In addition, a locked room inside building W-47 could not be assessed during the VSI, but was unlocked for investigation on December 4, 1992. The following items were observed in this room: a number of hydraulically driven fish processing machines, one partially full 55-gallon drum labeled "corrosive material" containing purechlor sanitizer, and a number of freon cylinders without any security chains. The equipment and containers were stored on the concrete floor.

Immediately on top of this room, 30 to 40 feet above the ground next to the ceiling, were shelves of several 5-gallon buckets (photograph 32) and four 55-gallon drums (photograph 33) whose labels could not be read from a distance. A Port of Seattle representative reported that the 5-gallon buckets were labeled "germicidal and fungicidal agents containing iodine." One of the

55-gallon drums was partially full and labeled "factory hydraulic oil." The other three drums were empty, but were labeled as diesel fuel with PANOCO tags. In addition, stacks of plastic trays and pieces of polyvinyl chloride piping were stored here. Next to this room was an area where waste food containers, other rubbish, and one 5-gallon bucket of corrosion inhibitor were stored (photograph 34).

Wastes Managed
Material stored in this location include: motor oil, refrigeration oil, mineral acid, mineral thinner, transformer oil, kerosene, fiberglass compound, resin solution, corrosive inhibitor, corrosive compounds, freon, germicidal and fungicidal agents containing iodine, hydraulic oil, and diesel fuel. There were also a number of drums with unidentified contents.

Release Controls and History of Releases
The transformer, drums, and buckets were stored on wooden pallets. The transformer oil had been collected in an open pan that was placed on the floor. There is no secondary containment besides the building itself and the concrete floor at this location. The integrity of the concrete floor could not be determined since the interior of building W-47 was too dark during inspection. A contaminated area on the floor next to the containers of mineral acids was observed. No other history of releases from this unit was found.

Release Potential and Rationale
There is a high possibility of spills from the open container, but release potential to soil, groundwater, and surface water from spills are low since the building is enclosed and paved inside. The potential of a contaminant release to air is moderate from open containers or a spill.

4.4 SOLID WASTE MANAGEMENT UNITS AT DAS

This section describes SWMUs located in the DAS area at Terminal 91.

4.4.1 SWMU 37 - CAR WASH STATION

The car wash station is located in Building W-158 (Figure 3), at the north end of the area leased by DAS (photograph 35). At the wash station, old aquacoating is removed from the exterior of automobiles using degreasing soap, and new aquacoating is applied. Discharge from aquacoating removal is released to the sewer system, where it flows to the Municipality of Metropolitan Seattle before it is discharged (Gagner 1992). However, during the VSI, runoff from the aquacoating removal process was observed

running out of the car wash station and entering the storm water system.

Wastes Managed
The degreasing solution used to remove aquacoating is a strong basic solution containing aqua ammonia, which is a hazardous substance listed in 40 CFR Section 302.4 and has a reportable quantity. New aquacoating solution containing antioxidant and isopropyl alcohol (Appendix C) is reapplied to cars at this location.

Release Controls and History of Releases
Drains within building W-158 are designed to collect aqua ammonia wastewater from car washing and direct the wastewater to the Municipality of Metropolitan Seattle sewer system; however, this solution was observed discharging to an outdoor storm drain during the VSI. No other information on the past release history at this location is known.

Release Potential and Rationale
The potential of contaminant release from this SWMU to air and surface water is high because the contaminants are volatile, flow-out onto the open pavement, and enter the storm drain which flows to Elliot Bay. The potential for contaminants to reach the soil and groundwater is low to moderate, depending on the integrity of the underground storm sewer system.

4.4.2 SWMU 38 - PAINT AND MOTOR OIL WASTE IN BUILDING C-154

On the northern end of DAS-leased facilities next to Building C-154 (Figure 3), waste paint and motor oil were stored separately in two 55-gallon drums (photograph 36). These drums, which appeared to be in good condition, were covered with lids and were placed on pavement. These wastes are shipped off site every 6 months. DAS generates approximately ten 55-gallon drums of wastes per year (Gagner 1992).

Wastes Managed
During the VSI, waste paint and motor oil were the only wastes stored at this location. These wastes may contain metals and VOCs, and are potentially characteristic RCRA hazardous wastes for toxicity.

Release Controls and History of Releases
The two drums were placed on top of pavement without any release controls. There is no documentation of releases at this location nor was there any visible evidence of releases at the VSI.

Release Potential and Rationale
The drums appeared to be in good condition; however, there is no secondary containment. The potential for contaminant release to the soil, groundwater, surface water, and air is low.

4.4.3 SWMU 39 - PAINT FILTER WASTE STORAGE AREA

Filters are used at the DAS paint booth in building C-155 to prevent paint particles from escaping the building and entering the environment. Filters cover the entire side walls and ceiling of the paint booth. The isocyanate-contaminated filters are removed every month from the side walls and are stored inside the building for up to 6 months until disposal. The ceiling filters are removed once a year and are considered nonhazardous wastes (Gagner 1992). The facility is designated as a small-quantity generator.

Wastes Managed
Waste filters generated in the paint booth are contaminated with paint particles and isocyanates. Contaminated filters are generated every month.

Release Controls and History of Releases
Filters are stored in drums inside a locked room in building C-155. This room was not open for inspection during the VSI. There is no documentation of releases at this location.

Release Potential and Rationale
Since filters are stored inside the building and inside drums, the likelihood of release to soil, groundwater, and surface water is low. The potential for release of paint particles to air is moderate during the time the contaminated filters are handled.

4.4.4 SWMU 40 - SHORT FILL

DAS uses the short fill area located next to Lake Jacobs to park cars and trucks once they are unloaded from ships. The short fill area consists of two berms connecting Piers 90 and 91 and dredged material placed between them as fill. The berms are long mounds with a high permeable sandy gravel (structural fill) core covered with rip-rap. The low permeable contaminated dredged fill was placed between the berms before being topped with approximately 16 feet of uncontaminated structural fill, and finally paved with asphalt.

The Terminal 91 Short Fill Project was designed, completed, and monitored with the oversight of the U.S. Army Corps of Engineers, EPA Region 10, and Ecology in a period between 1984 and 1986. The fill was designed with the objective of adequately containing the contaminants present in the dredged sediments. The

contaminated material placed in the short fill most likely would meet today's standards for open water disposal (i.e., Puget Sound Dredged Disposal Analysis) (Malek 1993).

The dredged materials contained industrial contaminants such as metals, VOCs and SVOCs. Overall confinement is designed to be related to the interrelationship between the hydraulics and bio-geochemistry of the material as described below.

First, the low permeability of the dredged material is designed to limit the overall flow rate and transport of contaminants through the unit. Second, the saturated anoxic conditions within the dredged material are designed to limit the release of inorganic and organic contaminants from the dredged material and into the groundwater. Third, the highly permeable berm allows tidal action to constantly mix fresh, oxygenated seawater into the berm. This fresh oxygenated seawater should react with any reduced inorganic or organic contaminants that are being slowly released from the dredge material at very near the berm-dredged material interface. This should result in the precipitation and immobilization of the inorganic contaminants, along with the enhanced aerobic biodegradation of any organic contaminants within the berm. Fourth, any remaining contaminants not fully immobilized or degraded in the inner portions of the berms would be diluted in the outer portion of the berm by tidal mixing and dispersion (Converse 1992b).

The regulatory agencies worked with the Port of Seattle to develop the short fill design, including a monitoring system, performance criteria, and a contingency plan outlining responses the Port of Seattle would undertake if unacceptable contamination occurred. These requirements were contained in a permit from the U.S. Army Corps of Engineers and a consent agreement with Ecology (Malek 1993).

A system of monitoring wells was placed in the contaminated dredge fill, in the cap material, and in upgradient groundwater flow direction from the short fill. Well locations were chosen to monitor the performance of the system in terms of hydraulic flow and contaminant concentrations. To date, the short-fill structure has met the regulatory and environmental requirements outlined in the consent agreement between the Port of Seattle and Ecology (Converse 1992b).

Wastes Managed

Low level contaminated dredge material, potentially including metals, VOCs, and SVOCs were used to fill between the berms.

Release Control and History of Releases

This dredged material is placed on fill berms and is covered with approximately 16 feet of clean fill cap (Converse 1992b). Monitoring wells placed in the dredge fill, cap material, and

upgradient groundwater flow direction are used to monitor release of contaminants. Groundwater has been monitored over the past 6 years at this location in accordance with a consent agreement between the Port of Seattle and Ecology and a permit with the U.S. Army Corps of Engineers. The monitoring results indicate that releases from the fill have and continued to meet the regulatory requirements of the consent agreement (Malek 1993).

While some levels for a few metals including nickel were elevated in the south berm wells, the Port believes that these metals came from the clean structural fill in the berm itself and not from the contaminated dredge material (Converse 1992b).

Data collected over the past 5 years indicate there are no detectable organic contaminants and only low levels of metals within the berm. Low level contaminants in the berm have been detected in concentrations below saltwater standards and are well below 10 times the sampled background stations (Converse 1992b). Throughout the monitoring period, sampling indicates that the short fill had met and exceeded performance criteria (Converse 1992b).

Release Potential and Rationale

The area is lined with clean berms and is capped with 16 feet of clean fill and asphalt cover. Because the short fill area is placed directly within Elliott Bay, soil and groundwater are not pathways of concern. The short fill area is covered with clean structural fill and asphalt, and the potential of contaminant release to air is low. Release potential to surface water is moderate, since the dredged material is contaminated and in hydrological contact with Elliot Bay.

4.5 OTHER SOLID WASTE MANAGEMENT UNITS AT TERMINAL 91

The following SWMUs were also identified during the VSI. These SWMUs are categorized as "other" because they represent units that are either under the control of the Port of Seattle or not identifiably associated with any of the previous tenants (BEI, PANOCO, City Ice, or DAS).

4.5.1 SWMU 41 - WASTE STORED BENEATH VIADUCT

An area under the Garfield street viaduct and south of the BEI leased premises is used as a storage location for miscellaneous waste items identified during the VSI. Port of Seattle stated that this area is leased to City Ice. The items identified at this location during the VSI are: An inactive heat exchanger (photograph 37), a battery pack containing acids and explosive gases (photograph 38), stacks of tires, a trailer, and a number of unlabeled 55-gallon drums were identified at this location.

One 55-gallon drum was located next to a sewer discharge point (photograph 37). One 55-gallon drum on a wooden pallet was also observed at this location (photograph 39). The contents of the drums could not be determined.

Wastes Managed
A variety of wastes as listed above are stored beneath the viaduct. The types of wastes stored in the 55-gallon drums are unknown. The battery pack stored at this location contains explosive gases and acids.

Release Controls and History of Releases
There is no secondary containment for this storage area, but the area is paved with asphalt. An oily stain was observed near the sewer discharge point next to the lone 55-gallon drum. There is no previous documentation of release at this location.

Release Potential and Rationale
The likelihood of contaminant release from the drums to the sewer system and out to Elliot Bay is moderate because of the proximity of the drum to the sewer system. The likelihood of release from the observed oily stain to the air is also moderate, and the release potential to groundwater and soil is low since the area is paved.

4.5.2 SWMU 42 - DRUM STORAGE NEAR LAKE JACOBS

An outdoor area near the southeast corner of Lake Jacobs is used to store a number of 55-gallon drums labeled as nonhazardous but petroleum-contaminated soil (photograph 40). Some of the drums were on top of wooden pallets, some were on concrete, and some did not have lids. The stored material was reportedly soil cuttings from well borings. Port of Seattle reported that these soils were slightly contaminated with petroleum hydrocarbons, primarily from old asphalt and creosoted timber from old construction material.

Port of Seattle states that analytical data for this material is available and would be provided (Port of Seattle 1993), but this data was not supplied by the time of this printing.

Wastes Managed
Labels indicated that nonhazardous, but petroleum-contaminated soils were stored in the drums. No analytical data on these wastes are available, but based on their description they likely contain VOCs, SVOCs, and metals.

Release Controls and History of Releases
The area beneath the drums is paved with asphalt; however, the embankment adjacent to the drums slopes toward Lake Jacobs and is not paved. Some of the drums are stored on wooden pallets; some

are stored on concrete pavement. A few of the drums did not have lids. During the VSI, an oily sheen was observed on the asphalt next to the drum storage area. Port of Seattle reports that the sheen resulted from an unknown person placing an open container of motor oil next to the drums that leaked. This container has since been removed (Port of Seattle 1993). There is no past documentation of releases at this location. Drum integrity appeared adequate at the time of the VSI.

Release Potential and Rationale
In the event of a spill, VOCs, and potentially metals that are present in the wastes, could migrate to the soil and be washed into surface water during a storm. The potential for release to soil and surface water is moderate since the drums are stored along the edge of the embankment that slopes to Lake Jacobs. The potential for release to groundwater is low. The potential for release to air is moderate since some of the drums were not covered.

4.5.3 SWMU 43 - BERTH STATIONS AND VALVE VAULTS

Nineteen berth stations were observed at Terminal 91, as shown on Figure 3. Berths C, D, E, F, G, H, I, J, K, L, and M are located on Pier 91. Berths 1 through 8 surround Pier 90. The berth stations are used for fuel loading. Each station has a valve vaults for controlling the Terminal's pipe transport system. Berth stations are located on the pier and the associated valve vaults are contained within a box to trap leaks (photograph 41). Most of these valve vaults also have lids, but they do not fit tightly. Port of Seattle reported the following operational information:

> Berth stations C, D, E and 8 are used for fuel oil loading and off-loading. Berth K is available, though not currently used, for off loading oily waste water to BEI. The old inactive lines are in the process of being removed, H, I, J, have been removed. All petroleum and petroleum waste water piping on the facility is leased to BEI. Portions of that are subleased by BEI to PANOCO. All berth stations are on aprons over water.

During the VSI, an oily sludge accumulation was noted inside many of the vaults covered with wooden boxes. This sludge is pumped out on an as-needed basis and is processed by BEI (Hotchkiss 1992b).

Wastes Managed
The accumulated oily sludge in and around the berth stations and valve vaults are the main waste managed at these locations. No analytical data on these wastes are available, but likely contain metals, VOCs, and SVOCs associated with petroleum products.

Release Controls and History of Releases
There is one documented history of a spill from the berth stations. Approximately 100 gallons of diesel fuel were released into Elliott Bay on August 29, 1978. This release was the result of a malfunctioning valve. The spill was bermed and cleaned up with absorbent pads and absorbent materials (Chempro 1988).

Some of the berth station valve vaults are covered by a wooden box on paved ground, and some are uncovered. The vault covers do not fit tightly and therefore, do not entirely restrict the entry of rain water or the escape of spilled oil. The integrity of the berth station containers appeared adequate. No records of past releases from these stations were found in the preliminary review.

Release Potential and Rationale
Sludge accumulation was observed in and around the berth stations and valve vaults. Releases from berth stations located above Elliott Bay would discharge directly into the bay, while discharge from berth station vaults in the ground would release to the soil. Release potential from the berth stations vaults is moderate to surface water and low to all other pathways. The surface water release potential is moderate because in the event of a leak or an overflow from the vault, contaminants could be released directly to Elliott Bay.

4.5.4 SWMU 44 - WASTE OIL STORAGE SHED

A 10-foot-tall metal storage shed, with one open side, was located outside building W-48 (Figure 3). The northern end of Building W-48 is leased by Commercial Crating, Inc., a wooden box and crate construction company. The shed, used by Commercial Crating, Inc. has a metal bottom (photograph 45). Among numerous miscellaneous items, the shed housed two open-bung 55-gallon drums containing waste oil and antifreeze waste, and 5-gallon buckets containing adhesive material. Some of the containers were labeled "flammable." A small metal cabinet was used to store paint buckets. This shed has been removed since the time of the VSI.

Wastes Managed
Waste oil, antifreeze, paint, and adhesive material were stored at this location. Some of the containers were labeled "flammable." No analytical data on these wastes are available. These wastes likely contain metals and VOCs.

Release Controls and History of Releases
The 55-gallon waste drums with open-bungs and the 5-gallon buckets were stored inside a metal shed placed over a paved lot. The bottom portion of the metal box appeared to be corroded. No documented information on releases from this area is available.

Release Potential and Rationale
The potential for spills from the open-bung drums in the shed is high. Since the drums are within the shed and the area is paved, the release potential for soil, groundwater, and surface water is low. The potential for contaminant release to air is moderate.

4.5.5 SWMU 45 - STORM DRAIN AT NORTH END OF TERMINAL 91

At the northern end of the Terminal 91 property, a storm drain enters the Port of Seattle property from the Burlington Northern rail yard, connects to several catch basins, and exits north into the City of Seattle's vactor truck dump site (Port of Seattle 1992). The Port of Seattle reported observing oil collecting in the first catch basin on the Port of Seattle property. The Port of Seattle states that the oil was evidently from the adjacent Burlington Northern rail yard. The catch basin was cleaned, and the City of Seattle closed the drain to stop drainage into the vactor truck dump site in 1989 and 1990. This drain was later reopened because of backup onto Port of Seattle property (Port of Seattle 1992). During the VSI, an oil residue was observed on pavement around the storm drain next to the Burlington Northern rail yard. This area is identified as 5.1 on Figure 3.

Wastes Managed
Storm run-off from the rail yard is managed by the storm drain. Waste oil was observed to be collected in the catch basin. The waste oil potentially contains metals, VOCs, and SVOCs.

Release Controls and History of Releases
The storm drain enters into a catch basin. The integrity of the catch basin could not be determined during the VSI. An oily residue was observed on pavement around the storm drain. No information on the maintenance or periodic cleaning of the catch basins was provided.

Release Potential and Rationale
Because of the presence of oily residue on pavement around the storm drain and the unknown integrity of the catch basin, potential of contaminant migration to soil, air, and groundwater is considered moderate. Release potential to surface water is high since waste oils in the drain have been reported and the storm drain catch basin discharges to Elliot Bay.

4.5.6 SWMU 46 - TWO STORM DRAINS AT CENTER OF TERMINAL 91

At the center of the Port of Seattle property, there is a 92-inch storm drain and combined sewer overflow discharge. Port of Seattle states that the storm drain is owned and controlled by the City of Seattle (Port of Seattle 1993). Oily discharges from the drain were noted in the 1980s, and were traced to the storm

drain line connecting the system to the Burlington Northern rail yard drainage (Port of Seattle 1992).

Investigations by Ecology and the U.S. Coast Guard at the Burlington Northern rail yard revealed a large quantity of oil entering the storm drain system through saturated soil caused by a leaking pressurized oil line for fueling the heaters in cabooses (Port of Seattle 1992). This line had been severely corroded by acid from maintenance practices on the batteries of the diesel and electric locomotives. There is no analytical information available on the waste oil at this location. The leaking line was fixed by Burlington Northern, and oil was removed from the storm drain system (Port of Seattle 1992). This storm drain is identified as 5.2 on Figure 3. Contaminated soil has not been removed.

Port of Seattle also reports a 44-inch storm drain that crosses Terminal 91 and exits at slip 91W. This drain reportedly receives storm water from off-site as well as drainage from the City of Seattle vactor truck dump site located at the northwest end of Terminal 91 (Port of Seattle 1993). This drain was not inspected during the VSI.

Wastes Managed
Waste oil potentially containing metals, VOCs, and SVOCs were managed at the 92" storm drain. The 44' storm drain may manage sludge run-off from the City of Seattle's vactor truck dump site.

Release Controls and History of Releases
Oily discharges from the 92" storm drain were noted in the 1980s. The oil was entering the storm drain through oil saturated soil caused by a leaking pipeline. No release controls for the drains are known.

Release Potential and Rationale
At the 92" drain, potential of contaminant migration to soil and groundwater is moderate since a release has already occurred and the resulting source of contamination was not cleaned-up. Oily waste was removed from the storm drain. Since the storm drain discharges directly to Elliott Bay, the potential of migration to surface water is high. Potential of contaminant migration to air is low since the spill occurred off-site almost 10 years ago. No cleanup of the contaminated soil has occurred. Release potential from the 42" drain is not known. The drain was not expected during the VSI and there is no known history of releases there.

4.5.7 SWMU 47 - ABANDONED OIL/WATER SEPARATOR

An abandoned oil/water separator was located at the south end of Pier 91 near Tank T-91J (photograph 4). There is some confusion regarding the operational history of this unit. BEI and the Port

of Seattle state that this oil/water separator was operated by PANOCO (BEI 1993 and Port of Seattle 1993, respectively). PANOCO maintains that they are unaware of this separator and that company records do not indicate that PANOCO ever leased or decommissioned this unit (Converse Consultants, Inc. 1993). According to BEI, this unit was taken out of service by PANOCO in 1989 (BEI 1993). It appears that this unit has not been used for several years. The oil/water separator was an underground unit. The area is currently paved with concrete. Limited information is available for this unit.

Wastes Managed
Oily wastewater was treated in the oil/water separator. No analytical results on wastes managed at this unit are available. These wastes may have contained metals, VOCs, and SVOCs.

Release Controls and History Releases
No information on release control devices for these drains is available nor visible. There is no documented information on releases from this unit.

Release Potential and Rationale
Since the unit is underground and at the end of the pier, the potential for release of waste oil to soil and groundwater is low. Release potential to surface water is moderate to high for this area depending on the integrity of the separator unit. The likelihood of contaminant release to air is low.

4.5.8 SWMU 48 - TRANSFER PIPING

Extensive below-ground steel transfer piping was, and still is, used to service ships at the piers as well as to transfer product and dangerous and non-dangerous wastes from trucks and between tanks in the tank yards (Figure 6) (Photograph 42) (BEI 1992a). Some transfer piping from the small yard has been decommissioned by BEI. This piping was removed from service, washed by flushing, and filled with concrete in March 1991. The decommissioned piping was approximately 500 feet long and made of 3- to 6-inch piping. No information on clean-up activities at this location is available.

Wastes Managed
The below-ground piping is used to transfer product waste oil water, and waste oil designated as dangerous and non-dangerous waste from tank to tank.

Release Control and History of Releases
Because the exact locations of the pipeline releases described below are unknown and contamination in the subsurface resulting from them will likely be intermixed and indistinguishable, the releases are being combined under this single SWMU heading.

Six releases of bunker oil, black oil, and waste oil associated with the pipeline at Terminal 91 are reported for the period from 1978 to 1986 (Chempro 1988). The exact locations of these pipelines releases are not known.

The first release was 42-gallons of bunker C fuel on March 11, 1978, onto asphalt paving. Some of this oil was released to a storm drain connected to Elliott Bay. This release was caused by an oil line breakage resulting from an earthquake. The spill was cleaned up with absorbent pads. Port of Seattle personnel repaired the pipeline (Chempro 1988).

The second release, on February 6, 1979, was 50 to 100 gallons of bunker oil fuel on asphalt in the Terminal 91 vicinity. The spill was caused by an overflowing valve pit, and was contained on the dock (Chempro 1988).

The third release was a February 22, 1979 spill of 100 to 200 gallons of bunker C fuel on asphalt at Terminal 91. The release was caused by an overflowing valve pit, and was contained on the dock (Chempro 1988).

The fourth release was a March 22, 1979, spill of 2,000 gallons of black oil used for fueling purposes. The release was caused by failure of a tee connection in the oil line belonging to BEI. The release occurred during the off-loading of a barge. The black oil was released onto Terminal 91 asphalt. Approximately 2,000 gallons of oil were pumped up, and absorbent materials were used to clean up the spill (Chempro 1988).

The fifth release was a 1- to 2-gallon spill of waste oil into Elliot Bay and onto a dock on September 25, 1985. The spill was caused by leakage of a valve pit during dock transfer. An oily sheen was observed on the water. The release was bermed, and cleaned up with absorbent pads and absorbent materials (Chempro 1988).

The sixth release was a 1986 spill of an unknown quantity of what may have been bunker fuel onto soil and asphalt. The release was the result of a ruptured pipeline near a truck loading area, where tanks 102 through 104 were being unloaded. The Port of Seattle replaced the damaged pipeline and repaired the asphalt paving (Chempro 1988).

<u>Release Potential and Rationale</u>
Some of the transfer piping was removed from service, washed by flushing, and filled with concrete in March 1991. Complete knowledge of leaks or releases is impossible to obtain since the piping is underground. The groundwater beneath the facility is contaminated and the transfer piping is a potential source of the contamination. From the known spills, there are no records to indicate that confirmation samples were collected to demonstrate

successful removal. Based on the spill history and the unknown integrity of the piping, the potential for soil and groundwater contamination is high. Release potential to surface water from the transfer piping is moderate and the release potential to air is low.

5.0 AREAS OF CONCERN (AOC)

This section discusses Areas of Concern (AOCs) identified during the VSI file review. These areas consist of one-time spill locations or other areas that pose environmental concerns, but for which insufficient information exists to include them within the narrower definition of a solid waste management unit.

5.1 AOC 1 - ALLEY BETWEEN BEI AND CITY ICE

Oily contaminated soil was noted in the blind alley between BEI's Marine Diesel Oil Yard and City Ice's Building M-28 on the west side of the BEI facility (photograph 46). This alley is unpaved and is spottily vegetated. A dead bird was observed here (photograph 47). The exact source of the soil contamination is not known. Release potential to groundwater is moderate since the soil is contaminated and the area is unpaved.

5.2 AOC 2 - USTS AND UST RELEASES ON TERMINAL 91 PREMISES

There are fifteen current or former underground storage tanks (UST) identified as T-91A through T-91N on figure 3. UST investigations at Terminal 91 indicated soil contamination around tanks T-91-A, -B, -C, -G, -K, and -N. The compounds benzene, xylene, and total extractable petroleum hydrocarbons (TEPH) were detected at levels above Model Toxics Control Act cleanup levels, in soil samples collected to a depth of a 9 feet, around Tank T-91-A (ERM 1990). Low levels of TEPH were present in the upper 10 feet of soil around Tanks T-91-B and T-91-C (ERM 1990). Soil excavation and samples, collected in August 1989 to assess subsurface conditions around Tanks T-91-D, -E, -F, -G, and -N, indicated soil and groundwater contamination resulting from releases at tanks T-91-G and T-91-N (ERM 1990). Elevated levels of TEPH were detected in soil samples collected at 7.5 and 14 feet below ground surface around Tank T-91-K (ERM 1990). Eleven inches of free product were found in an upgradient well during the 1989 removal of Tank T-91-N (Port of Seattle 1992). The location of this release is identified as 3.4 on Figure 3.

Contamination in the vicinity of T-91-N is documented in several sources. Hydrocarbon contamination of soil and groundwater in the vicinity of underground storage Tank T-91-N was documented during the investigation following construction of building W-390

(HLA 1990). Free product was observed during excavation of the foundation for building W-390 (Port of Seattle 1992). The location of this contamination is identified as 3.3 on Figure 3. The potential for groundwater contamination is high at these locations. An Interim Measures Workplan is under development to remove the light non-aqueous phase liquid (LNAPL) layer present in this vicinity. The exact source of this LNAPL and subsequent groundwater contamination in this vicinity is unclear. Tank 91N and other nearby areas (see discussion of SWMU #2, #22, and AOC #13) are likely source candidates.

Locations of active, abandoned, and removed USTs at Terminal 91 are shown on Figure 3. The activity status, size, type, and the proposed removal date of these tanks are listed in Table 1.

TABLE 1
TERMINAL 91 UNDERGROUND STORAGE TANKS

Tank Number	Status	Size (gallon)	Type	Proposed Removal Date
T-91A	active	3,000	gasoline	early 1994
T-91B	active	7,000	gasoline	early 1994
T-91C	active	10,000	gasoline	early 1994
T-91D	abandoned	10,000	diesel	early 1994
T-91E	abandoned	10,000	diesel	early 1994
T-91F	abandoned	10,000	diesel	early 1994
T-91G	abandoned	10,000	gas	early 1994
T-91H	active	12,000	heavy oil, boiler	early 1994
T-91I	active	672	diesel	early 1994
T-91J	possibly active	unknown	oil/water separator	unknown
T-91K	active	50	diesel	early 1993
T-91L	abandoned	unknown	oil/water separator	unknown
T-91M	removed	300	diesel	July 1987
T-91N	removed	672	diesel	December 1989
T-91O	removed	500	gas	1986 state

5.3 AOC 3 - OLD BERTH PIPELINES

Each of the docking berths at Piers 90 and 91 are connected by the Terminal pipeline system for such services as ballast water management and fuel delivery. Pipelines at Pier 91 associated with berths H, I, and J are in the process of abandonment (Hotchkiss 1992b). These pipelines have been flushed to remove product residue. Port of Seattle states that these pipelines have been removed and that contaminated soils were not observed (Port of Seattle 1993). Some of the old pipeline parts stored on a skid at Pier 91 are oily and stained (photograph 48). The likelihood of releases to soil, groundwater, and surface water from these pipelines is low to moderate, depending on the integrity of the pipelines.

5.4 AOC 4 - LEAKING MOTOR

A leaking motor was observed next to building C-154 on the DAS-leased premises. A yellow stain was observed on the pavement next to the generator (photograph 49). The precise nature of this contamination is unknown. The potential for contamination of soil and groundwater is moderate. The potential for contaminant run-off to surface water is likely if a storm drain is nearby. Chemical analysis of this waste material is needed to determine the potential for air contamination.

5.5 AOC 5 - PCB TRANSFORMER PADS

Two wipe samples were collected from the transformer pad near Building T-38 in 1986, when PCB transformers around the building were removed. Both wipe samples indicated the presence of PCBs higher than 100 µg/100 cm2 (GE 1986). The pad was removed and sent to the Chem-Security System, Inc. landfill in Arlington, Oregon, in 1986 (Hotchkiss 1992c). There is no information on soil sampling to confirm that the extent of PCB contamination was limited to the pad. The potential for soil contamination is low for this area.

5.6 AOC 6 - HYDROCARBON CONTAMINATION, BUILDING W-40

During a 1991 soil boring installation at the new Elliott Bay Marine access ramp hydrocarbon odors were noted (Port of Seattle 1992). This area is southwest of Building W-40 and is identified as 3.5 on Figure 3. This area is leased by City Ice, There was no cleanup at this location (Hotchkiss 1992a). The potential for contaminant migration to groundwater is moderate to high at this location.

5.7 AOC 7 - CONCRETE APRONS

Petroleum hydrocarbons were noted in 1992 from soil borings installed for new concrete aprons on Piers 90 and 91. The location of the contamination is identified as 3.6 on Figure 3. Excavation revealed layers of old asphalt and creosoted timber (Port of Seattle 1992), which represent old construction materials left on-site during subsequent rehabilitations of the Terminal 91 area. These waste materials are still present at this location (Hotchkiss 1992a). Release potential is moderate to soil and surface water and low for groundwater and air.

5.8 AOC 8 - STORM DRAIN CONTAMINATED SOIL

In 1985, petroleum-hydrocarbon-contaminated soils were noted in an area south of the BEI property and northeast of Lake Jacobs. The contaminated soils were identified during the excavation of a trench to relocate a storm drain. This AOC is identified as 3.7 on Figure 3. The sources of these contaminants are unknown, and no action has been taken to remove the contaminants (Hotchkiss 1992a). Potential of contaminant migration to groundwater is moderate because the soil is covered with asphalt.

5.9 AOC 9 - CONTAMINATED SOIL NORTHWEST CORNER OF PIER 91

In 1985, petroleum-contaminated soil and oily water were noted in the excavations for new light standards at the northwest corner of Pier 91 (Port of Seattle 1992). This contamination is identified as 3.8 on Figure 3. The sources of these contaminants are unknown, and no action has been taken to remove the contaminants (Hotchkiss 1992a). The potential for contaminant migration from soil to groundwater is moderate at this location because the soil is covered by asphalt.

5.10 AOC 10 - TRIANGULAR AREA HIT

A triangular area due east of the BEI leased facility was found to contain petroleum-hydrocarbon-contaminated soils. Soil samples collected from this area indicated elevated levels of TPH (PRC 1992). The triangular area is identified on figure 3 as "Option to Expand Area." The Port of Seattle is considering this location for a fill station. No information on cleanup at this location is available. The potential for contaminant migration to groundwater is high for this area since it is in an uncovered area of the Terminal.

5.11 AOC 11 - OLD TANK FARM

An old tank farm, located just north of Pier 91, was identified from Port of Seattle and Navy drawings. This tank farm was installed in late 1920s or early 1930s and was demolished by the Navy after 1942 (Port of Seattle 1992). PANOCO reports that a lease transfer from Liberty Petroleum to Lawrence Warehouse Co. in 1932 indicates that the tanks contained oil and gasoline (PANOCO 1993). This tank farm is now paved over. This tank farm is identified as number 4 on Figure 3. There is no documentation of releases at this location. Part of this tank farm is now covered by building W-40. Insufficient information exists to determine a release potential.

5.12 AOC 12 - TANKS 340 AND 341

This unit consisted of two aboveground tanks that began operation in 1926. The tanks were closed some time between 1936 and 1971, prior to BEI's history at this site (Port of Seattle 1993). The tanks were located in Building 23, alongside the Wastewater Treatment Tanks (see SWMU 21) on the northwest edge of BEI's leased premises. No information on the type of wastes managed at this AOC is available, and there is no documentation of releases at this AOC (Figure 7) (Chempro 1988). Insufficient information exists to determine a release potential.

5.13 AOC 13 - TANK 1530

This 63,000-gallon aboveground tank began operation in 1926 and was closed in about 1936. It was located just outside the Small Tank Yard on the east side. No information on the type of wastes managed at this unit is available, and there is no documentation of releases from Tank 1530 (Figure 7) (Chempro 1988). Insufficient information exists to determine a release potential.

5.14 AOC 14 - TANKS 119 THROUGH 126

These elevated aboveground tanks were in operation from approximately 1936 to 1948, and were formerly designated as tanks 50 through 57. They were located along the northern edge of the Small Tank Yard. No information on the types of wastes managed at these AOCs is available. There is no documentation of releases at this AOC (Figure 7) (Chempro 1988). Insufficient information exists to determine a release potential.

5.15 AOC 15 - OIL BARREL DRAIN AND TUMBLER PITS

These pits began operation approximately in 1950. The removal dates for these units are not available; however, Port of Seattle states that these pits were operational under BEI (Port of Seattle 1993). The pits were located on the eastern edge of the BEI leased premises. These pits were below-ground concrete impoundments. There is no information on the type of wastes managed at these pits; however, the name of the unit implies that it managed oil. There is no documentation of releases at this AOC (Figure 7). Insufficient information exists to determine release potential.

5.16 AOC 16 - INACTIVE TRANSFORMERS

During the VSI a number of inactive transformers were observed next to building C-155 (photograph 43), at the northern end of the DAS-leased premises. The transformers were positioned on elevated concrete platforms. Port of Seattle reported that these transformers belong to and are operated by Seattle City Light under an easement. Another transformer on the west side of building W-47 (photograph 44), is leased by City Ice. This transformer was positioned on a bermed and elevated concrete platform. These transformers potentially contain PCBs. It is not clear whether
the transformer oils used in these units have been removed. There is no documentation of transformer oil or PCB releases at this location. No staining or other evidence of release at the concrete pads was observed during the VSI. The Port of Seattle stated that all of their Terminal 91 transformers have been checked and are certified as non-PCB containing (Port of Seattle 1993)

6.0 SUMMARY

This RFA includes areas identified in the draft RFA report prepared by Tetra Tech for the BEI facility in 1988, as well as additional areas at the Terminal 91 facility identified by PRC for this final report.

There are several SWMUs and AOCs that have a high potential to release contaminants to air, soil, groundwater, or surface water, mainly as a result of past releases that have not been addressed. All told, the RFA identifies 48 SWMUs and 16 AOCs.

7.0 REFERENCES

BEI 1992a. Addendum to July 5, 1988 Solid Waste Management Unit Report. Burlington Environmental. January 24, 1992.

BEI 1992b. RCRA Facility Investigation Work Plan, Burlington Environmental, Inc. Pier 91 Facility. Burlington Environmental, Inc. April 1992.

BEI 1993. Letter from John Stiller, BEI to Dave Croxton, U.S. Environmental Protection Agency, Transmitting Comments on Interim Final RFA. September 29, 1993.

Chempro 1988. Chemical Processors, Inc. Pier 91 Facility, Solid Waste Management Unit Report. Chemical Processors, Inc. July 5, 1988.

Converse 1990a. Site Investigation and Remedial Cleanup Action. Banker "C" Fuel Oil Line Break, Pacific Northern Oil, Pier 91. Converse Consultants NW. November 5, 1990.

Converse 1990b. Interim Product Extraction System Remedial Action Plan, Terminal 91. Converse Consultants NW. July 26, 1990.

Converse 1991. Site Investigations and Remedial Cleanup Action. Bunker "C" Fuel Oil Line Break. Pacific Northern Oil, Pier 91. Converse Consultants NW. September 24, 1991.

Converse 1992a. Annual Progress Report. Interim Liquid Hydrocarbon Recovery System, Terminal 91. Converse Consultants NW. March 5, 1992.

Converse 1992b. Final Project Report. Terminal 91 Short Fill Monitoring Program. Converse Consultants NW. October 20, 1992.

Converse Consultants 1993a. Final Phase I Environmental Site Assessment, February 16. 1993.

Converse Consultants 1993b. Comments on Interim Final RFA for PANOCO. December 22, 1993.

Croxton 1992. Personal communication between Noushin Arab, PRC Environmental Management, Inc., and David Croxton, U.S. Environmental Protection Agency. December 18, 1992.

Ecology 1991. Department of Ecology, ERT System Initial Report/Follow-up. Washington Department of Ecology. June 12, 1991.

EPA 1986. RCRA Facility Assessment Guidance. U.S. Environmental Protection Agency, Office of Solid Waste, Permits and State Programs Division. Washington, D.C.

EPA Aerial Photographic Analysis, 1993.

ERM 1990. Preliminary Underground Tank Assessment. ERM-Northwest, Inc. September 1990.

Gagner 1992. Personal communication between Noushin Arab, PRC, Environmental Management, Inc., and Mike Gagner, Distribution Auto Services. October 20, 1992.

GE 1986. PCB Sample Results. Letter from William Krake, General Electric Co. to Stan White, Industrial Electric Co. July 7, 1986.

Geo Engineers 1987. Summary of Supplemental Monitor Well Measurements, Proposed Facility Expansion, File No. 1074-02-1. Geo Engineers, Inc. August 31, 1987.

Hart Crowser 1989. Oil Seepage Investigation, Short Fill Pond, Terminal 91. Hart Crowser, Inc. September 11, 1989.

Hotchkiss 1992a. Personal communication between Noushin Arab, PRC Environmental Management, Inc., and Doug Hotchkiss, Port of Seattle. October 22, 1992.

Hotchkiss 1992b. Personal communication between Noushin Arab, PRC Environmental Management, Inc., and Doug Hotchkiss, Port of Seattle. December 14, 1992.

Hotchkiss 1992c. Telephone communication between Noushin Arab, PRC Environmental Management, Inc., and Doug Hotchkiss, Port of Seattle. December 14, 1992.

HLA 1990. Underground Storage Tank Investigation in the Vicinity of the City Ice Building, Terminal 91. Harding Lawson Associates. June 18, 1990.

Malek 1993. Interdepartmental Correspondence between John Malek, Dredging and Contaminated Sediments Specialists and David Croxton of U.S. Environmental Protection Agency. March 8, 1993.

Markwood 1992. Telephone communication between Noushin Arab, PRC Environmental Management, Inc., and George Markwood, Pacific Northern Oil Company. December 14, 1992.

Matthews 1992. Telephone communication between Noushin Arab, PRC Environmental Management, Inc., and Nathan Matthews, Burlington Environmental, Inc. November 18, 1992.

PANOCO 1993. Letter from Erick Miller, Converse Consultants NW to Dave Croxton, U.S. Environmental Protection Agency Transmitting Comments on Interim Final RFA. December 22, 1993.

Port of Seattle 1974. Port of Seattle Memorandum, Pier 91, Burlington Oil Spills, File No. P-901 91-100. July 8, 1974.

Port of Seattle 1986. Port of Seattle Memorandum from Bob Wells to Jerry Schneider. April 28, 1986.

Port of Seattle 1987a. Port of Seattle Memorandum, Terminal 91 Soils Analysis. July 31, 1987.

Port of Seattle 1987b. Port of Seattle Memorandum from Dave Aggerholm to Walter D. Ritchie. December 15, 1987.

Port of Seattle 1992. Burlington Pier 91 Facility. Letter from Douglas Hotchkiss, Port of Seattle to Dave Croxton, U.S. Environmental Protection Agency Region 10. September 30, 1992.

Port of Seattle 1993. Letter from Douglas Hotchkiss, Port of Seattle to Dave Croxton, U.S. Environmental Protection Agency Region 10, Transmitting Comments on Interim Final RFA. December 17, 1993.

Port of Seattle, 1993

PRC 1992. Visual Site Inspection of Terminal 91 on October 20-21, 1992. Trip Notes. PRC Environmental Management, Inc. October 20, 1992.

Suelzle 1992. Telephone Conversation between Noushin Arab, PRC Environmental Management, Inc., and Kim Suelzle, City Ice and Cold Storage Company. December 18, 1992.

Sweet-Edwards/EMCON Inc. 1990. Historical Background Search, Chemical Processors Inc., Pier 91 Facility. July 30, 1990.

Tetra Tech 1988. Draft Report, RCRA Facility Assessment, Chemical Processors, Inc., Pier 91. Tetra Tech, Inc. for Jacobs Engineering Group. April 28, 1988.

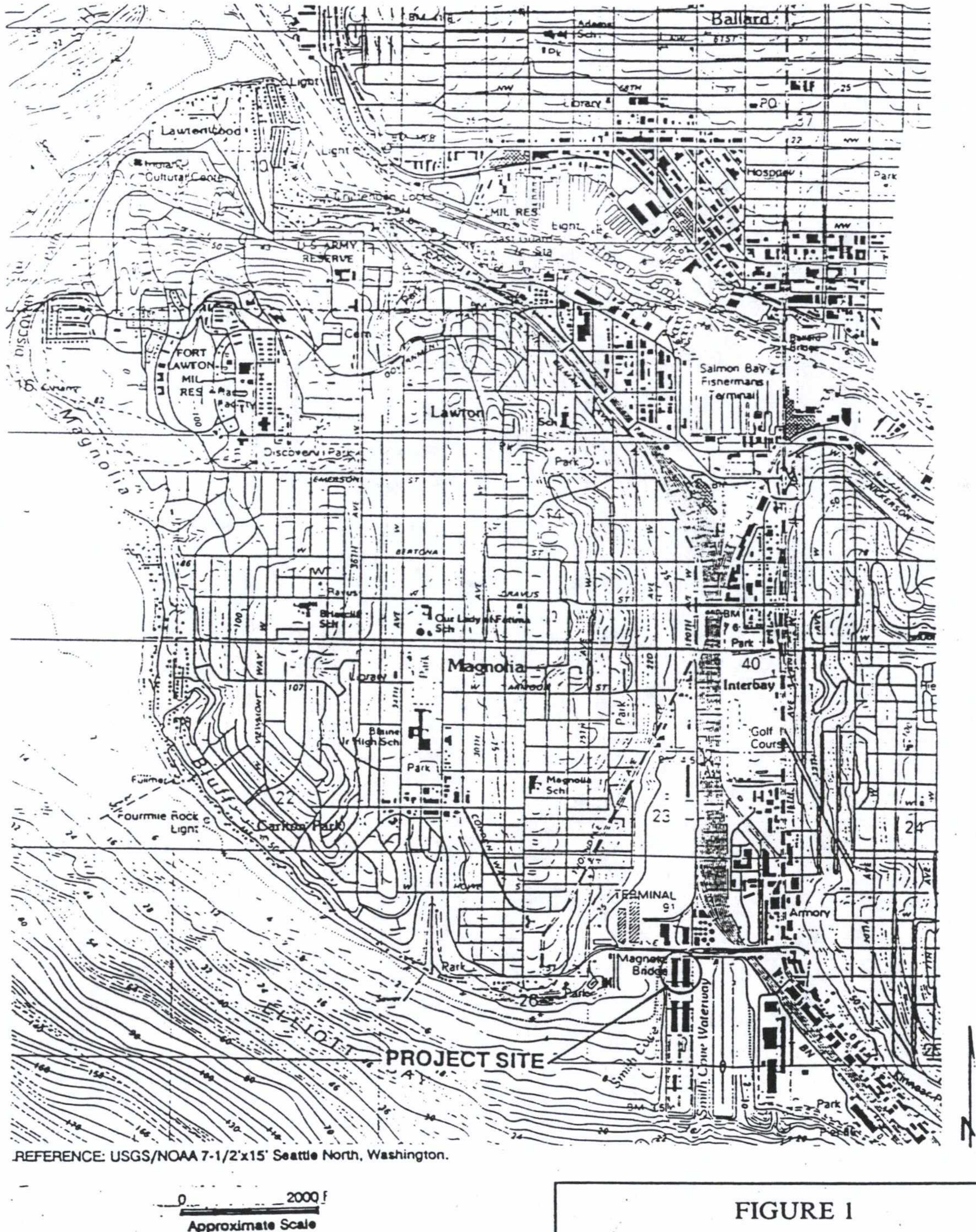


FIGURE 1

GENERAL SITE LOCATION, TERMINAL 91

Source: Converse 1990

PRC Environmental Management, Inc.

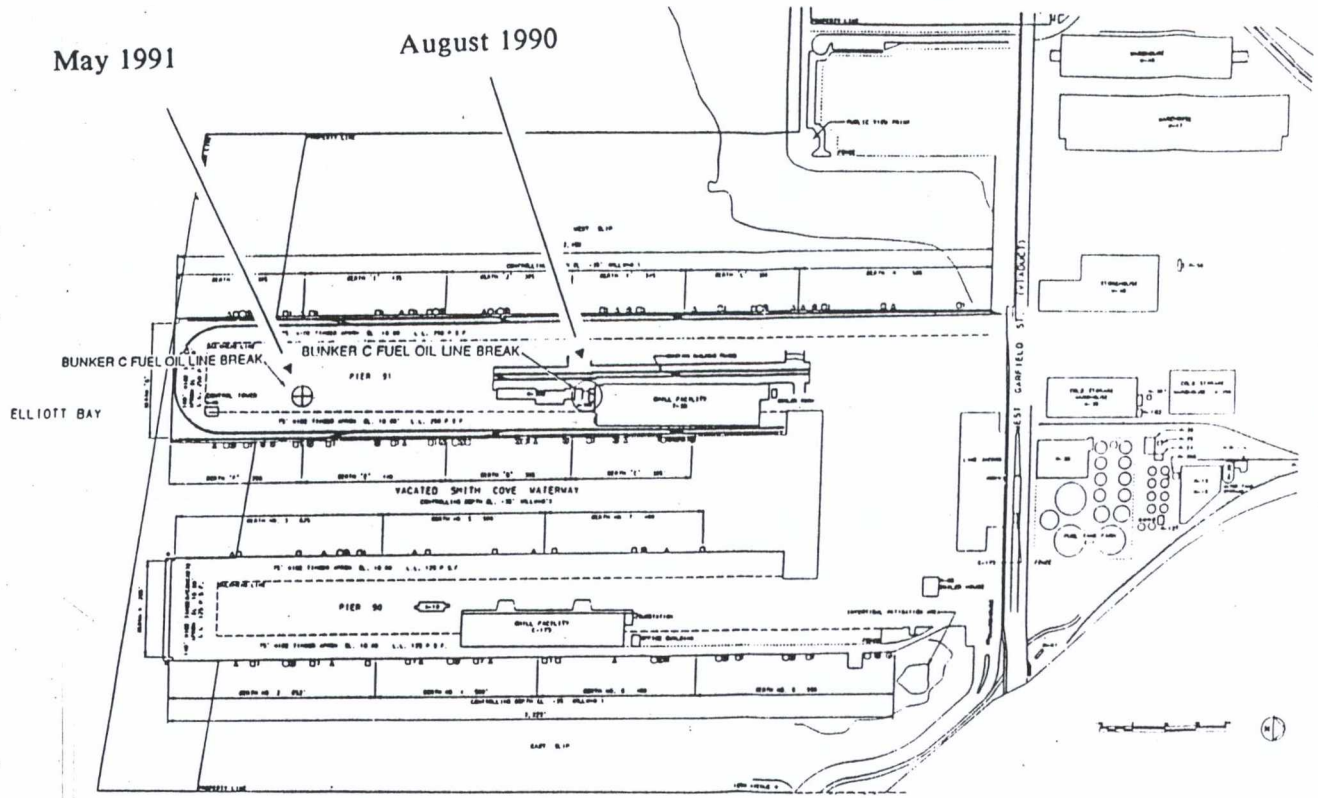


FIGURE 2

BUNKER C OIL LINE BREAK
PANOCO TERMINAL 91 FACILITY

Source: Adapted from Converse 1990a and Converse 1991

PRC Environmental Management, Inc.

DAS Option to Expand Areas--10 Acres

Wald Imports, Ltd.--L-2646, 42,000 s.f., 2,000 s.f. office

Commercial Crating Inc. --L-2597, 14,400 s.f.

U.S. Navy Property

W-50

W-48

Smith Cove Public Access

West Yard
4 acres

City Ice
W-47 30,000 s.f.

Property Line

Greenbelt

Pedestrian/Bicycle Path

Low Water Line

Inner Harbor Line

Mitigation Beach

DAS
Lease
Premises
40 Acres

■ 7

T-91B: 7900 gal gas (1990)
T-91C: 10000 gal gas (1990)
T-91D: 10000 gal diesel (ABND)
T-91E: 10000 gal diesel (ABND)
T-91F: 10000 gal diesel (ABND)
T-91G: 10000 gal gas (ABND)
T-91A: 3900 gal gas

Car Wash
W-158

Office
C-156

Auto Process Building
C-155

Auto Process Building C-154

■ 6

■ 5.1

Bikeway

Property Line

■ 3.5

City Ice
L-2437
W-40

T-91M: 300 gal diesel (RMVD 7/87)

4

T-91N: 672 gal diesel (RMVD 1/89)

City Ice
W-39 L-2437

City Ice
L-2409
W-39C

T-91 Realty
B-391

Arctic Alaska
B-392

T-91 J: Oil separator

T-91O: 500 gal gasoline (RMVD by ChemPro)

City Ice
L-2409
M-28

M-19

Chempro

■ 3.2

■ 3.4

DAS
Option to
Expand
Area

Property Line

Viaduct

Lake Jacobs

Gantlet Sp. Bridge

Mitigation Beach

Elliott Bay

Outer Harbor Line

Inner Harbor line

Terminal 91 Property Line

16th Ave W

15th Ave W

W Galer St

W Lee St

W Prospect

Royal Seafood

Modern Supply

Seattle Film Works

Adams News

A-1 Warehouse

RR-west easement
0.66 acres

RR-east easement
2.32 acres

Fence

Elliott Bay Park

Public Fishing Pier

A-2
(to be demolished)

Terminal 86/88
26.02 Acres

115' 270' 435' 310' 420' 360' 585'

100' Apron

H To be replaced 6/93-7/94 Nissen Primary Berth

I J K ChemPro (200 ft) L M

Pier 91

G

A-80 Control Tower

F PANOCO (to be relocated to C)

E D Fruit Ships C

■ 3.6

T-91K: 500 gal diesel boiler (XMPT)

T-91J: Oil separator

■ 3.4

Freeze Facility W-308

Chill Facility T-38

■ 1.3

■ 3.8 ■ 3.8

T-91 I: 672 gal diesel boiler (ABND 1977)

■ 1.2

8
DAS
Preferential
Use Premises
5 Acres

300' 500' 250' 600'

400' 450' 400' 650'

1 3 5 Navy 7

Nissan Secondary Berth

■ 3

■ 3.7

140' Apron

Pier 90

C-175
Future Chill Facility
To be constructed 3/93-11/93

■ 3.6

Under construction
(to be finished 2/93)

2 4 75' Apprx

Chill Facility
C-173
to be replaced 12/93-11/94

6 8 Foss

■ 5.2

New Concrete Apron 55' 430'

T-91H: 12000 gal boiler fuel (XMPT)

North

200' 0 600'

Legend:

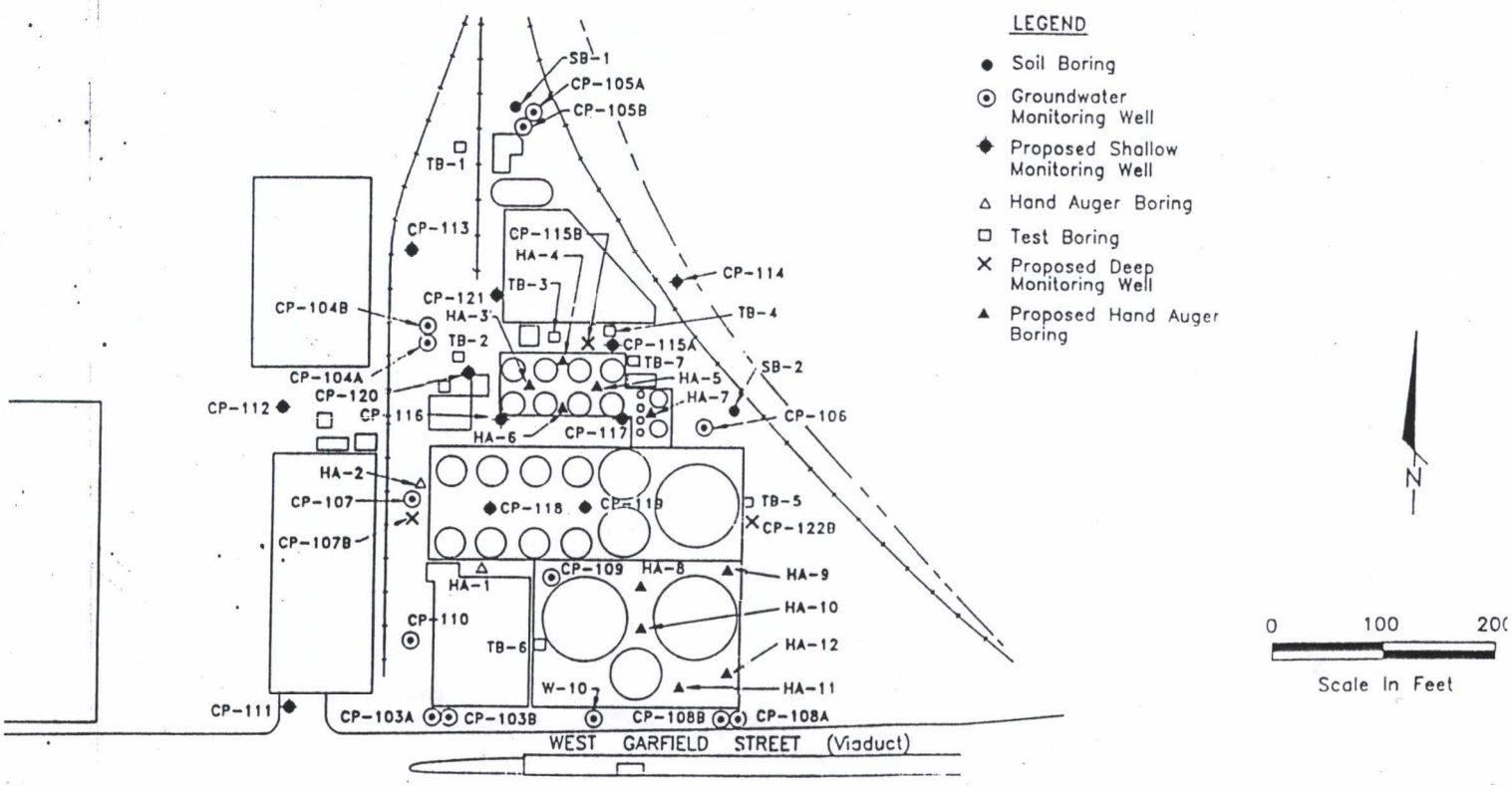
- Fuel Pipe
- Diesel Pipe
- Sludge Pipe
- Fuel Tanks
- Potentially contaminated sites (Refer to the letter to EPA)

Port of Seattle
Marine Planning and Development
September, 1992

FIGURE 3

TERMINAL 91 FACILITY MAP

PRC Environmental Management, Inc.

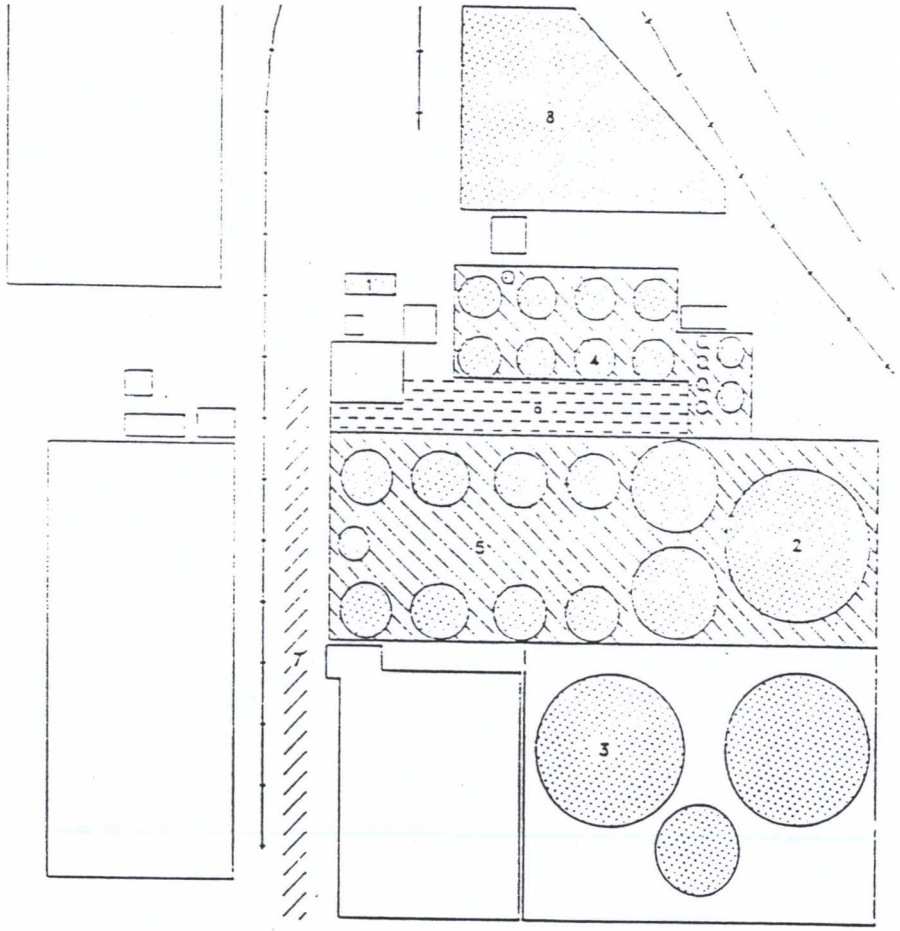


Source: Burlington 1992b

FIGURE 4

MONITORING WELL LOCATION MAP
BEI TERMINAL 91 FACILITY

PRC Environmental Management, Inc.



SOURCE

1. Oil-Water Separator
2. Diesel Yard Tanks
3. Big Yard Tanks
4. Small Yard Tanks
5. Waste Oil Spill Area
6. Pipe Alley Drainage
7. Piping System
8. Warehouse

N

0 50 100

Scale in Feet

FIGURE 5

SOURCES IN PATHWAY ANALYSIS
BEI TERMINAL 91 FACILITY

Source: Burlington 1992b

PRC Environmental Management, Inc.

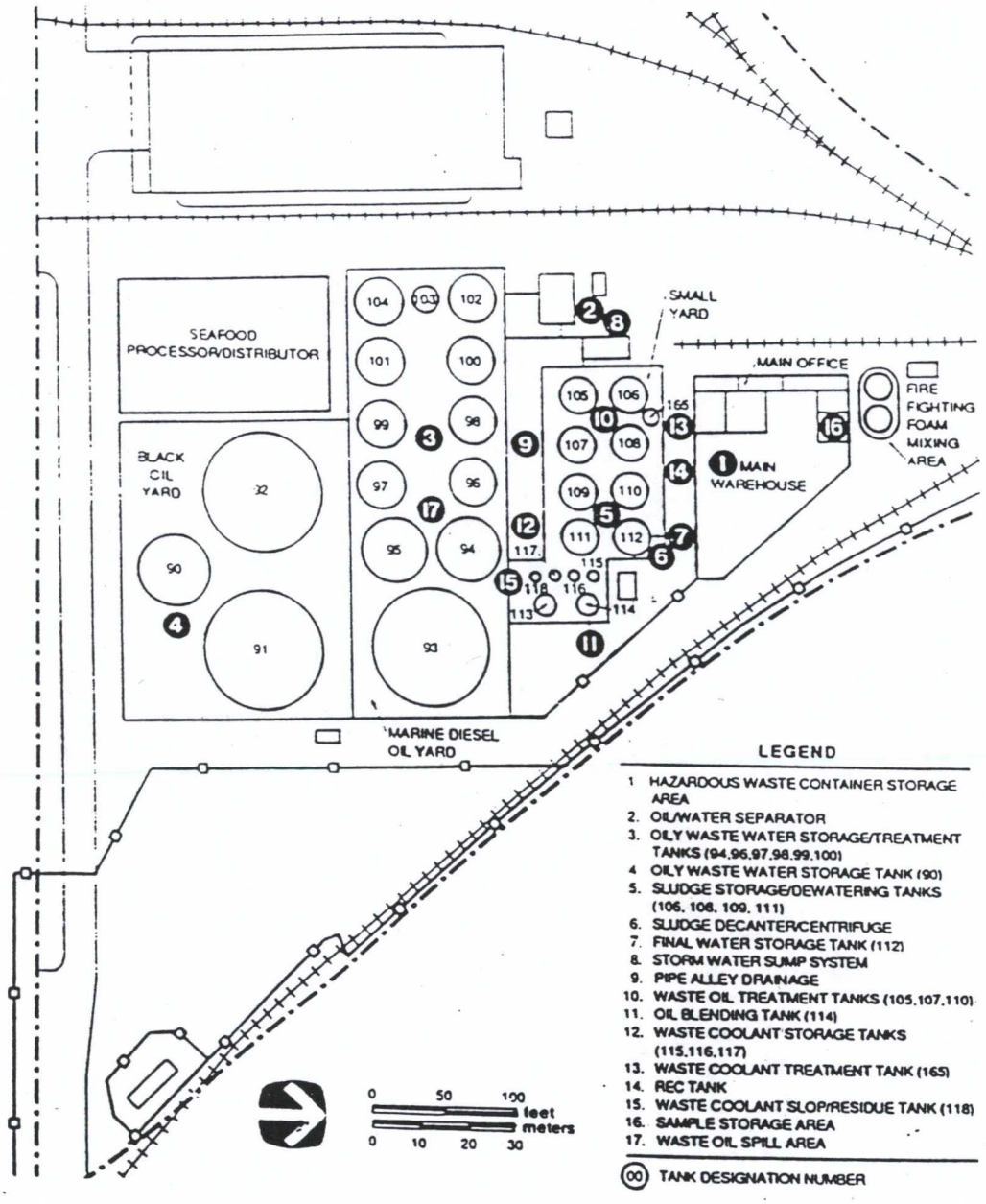
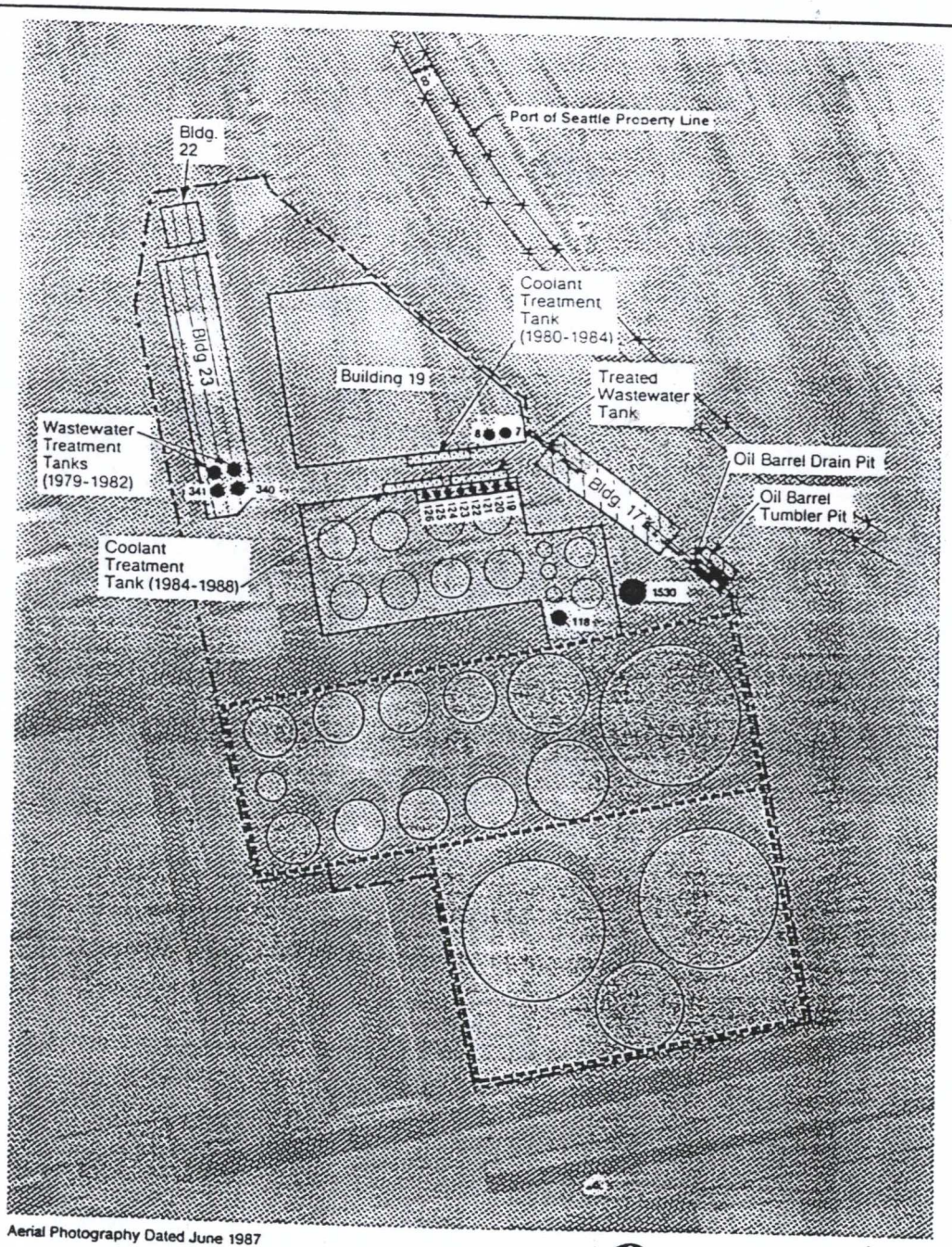


FIGURE 6

MAP OF RCRA-REGULATED UNITS AND SWMUs
BEI TERMINAL 91 FACILITY

Source: Tetra Tech 1988

PRC Environmental Management, Inc.



Source: Chempro 1988

FIGURE 7

CLOSED SOLID WASTE MANAGEMENT UNITS BEI TERMINAL 91 FACILITY

PRC Environmental Management, Inc.

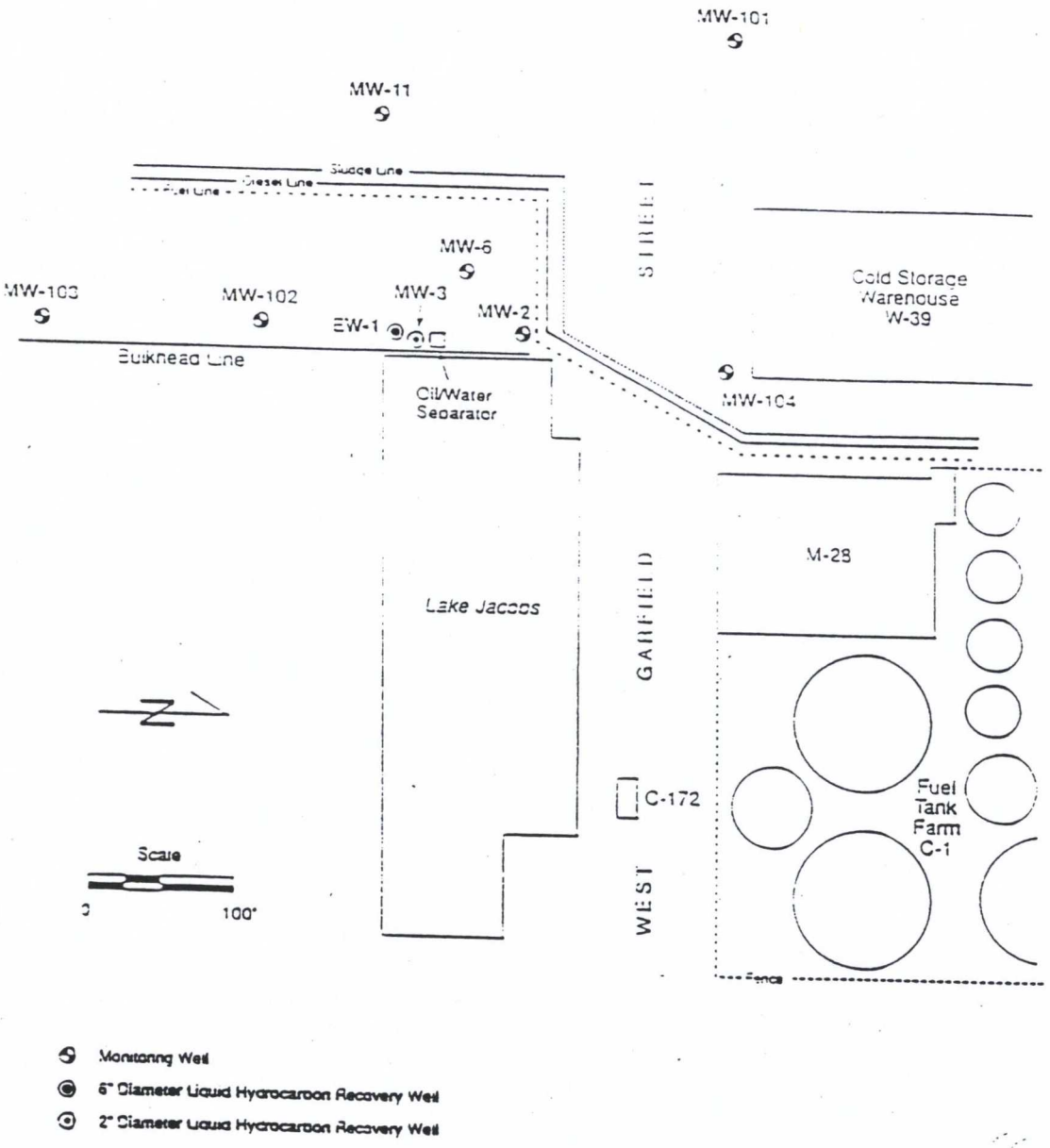


FIGURE 8

HYDROCARBON EXTRACTION SYSTEM MONITORING WELL LOCATIONS PANOCO TERMINAL 91 FACILITY

Source: Converse 1992a

PRC Environmental Management, Inc.

APPENDIX A

RCRA FACILITY ASSESSMENT REPORT
CHEMICAL PROCESSORS, INC.
PIER 91
SEATTLE, WASHINGTON

(Tetra Tech 1988)

The Tetra Tech, Inc. report is included in its entirety except for two sections entitled "Project Conclusions" and "Project Recommendations." As directed by U.S. Environmental Protection Agency (EPA), these sections have been removed because they are outdated; this Resource Conservation and Recovery Act (RCRA) facility assessment does not make final determinations for corrective action.

APPENDIX A

RCRA FACILITY ASSESSMENT REPORT
CHEMICAL PROCESSORS, INC.
PIER 91
SEATTLE, WASHINGTON

(Tetra Tech 1988)

JACOBS

TES IV

DRAFT REPORT
RCRA FACILITY ASSESSMENT
CHEMICAL PROCESSORS, INC., PIER 91
SEATTLE, WASHINGTON

JE JACOBS ENGINEERING GROUP INC.
ENVIRONMENTAL SYSTEMS DIVISION

IN ASSOCIATION WITH:
TETRA TECH
METCALF & EDDY
ICAIR LIFE SYSTEMS
KELLOGG CORPORATION
GEO/RESOURCE CONSULTANTS
BATTELLE PACIFIC NORTHWEST LABORATORIES
DEVELOPMENT PLANNING AND RESEARCH ASSOCIATES

U.S. ENVIRONMENTAL PROTECTION AGENCY
TECHNICAL ENFORCEMENT SUPPORT
AT
HAZARDOUS WASTE SITES

TES IV
CONTRACT #68-01-7351
WORK ASSIGNMENT NO. 683

DRAFT REPORT
RCRA FACILITY ASSESSMENT
CHEMICAL PROCESSORS, INC., PIER 91
SEATTLE, WASHINGTON

TETRA TECH, INC.
FOR
JACOBS ENGINEERING GROUP, INC.
PROJECT NUMBER: 05-B683-00
TC-3621-15

28 APRIL 1988

CONTENTS

FIGURES

1.0 INTRODUCTION

This report documents the Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) for the Chemical Processors, Inc. (Chempro) Pier 91 Facility (WAD000812917) located in Seattle, WA. The objectives of an RFA are to identify and gather information on releases at RCRA-regulated facilities to evaluate a facility's solid waste management units with respect to release of hazardous materials to all environmental media, and to determine the need for further actions and interim measures at the facility. This report combines the findings of the Preliminary Review (PR) phase and the Visual Site Inspection (VSI) phase of the RFA under the RCRA corrective action program. If sufficient evidence of contamination is found during the RFA, a RCRA Facility Investigation (RFI) may be required. As a result of the PR and VSI, some data gaps have been identified. The availability of data and summary of the project conclusions and recommendations are presented in this section.

1.1 PRELIMINARY REVIEW

The PR of the Chempro Pier 91 facility was conducted by examining and using information contained in U.S. EPA Region X and Washington Department of Ecology (Ecology) files. Additional information was obtained from local agencies including Puget Sound Air Pollution Control Agency (PSAPCA), the Municipality of Metropolitan Seattle (METRO) Industrial Waste Division, and the Port of Seattle Engineering Department. The following documents were reviewed:

- RCRA PART A Permit Application (Chemical Processors, Inc. 1982)
- Facility Inspection Reports (Ecology)

- Proposed Closure/Post-Closure Care Plan (Chemical Processors, Inc. 1987a)
- Waste Analysis Plan (Chemical Processors, Inc. 1986)
- CERCLA Preliminary Assessment/Site Investigation (U.S. EPA 1985)
- PSAPCA air monitoring inspection reports
- Metro wastewater discharge reports
- Hazardous waste manifests (Chemical Processors, Inc.)
- Facility/U.S. EPA correspondence letters
- Spill Inspection Reports (Ecology)
- Facility Contingency Plan (Chemical Processors, Inc. 1987b)
- Groundwater well drilling logs (Chemical Processors, Inc.)
- Chempro 1987 hazardous waste annual report
- Hazardous waste site evaluation report (Metcalf & Eddy, Inc. 1985).

The information gathered from these sources was used to identify and characterize potential releases from the Chempro Pier 91 facility, and to identify activities in subsequent phases of the RFA.

1.2 VISUAL SITE INSPECTION

The VSI for the Chempro Pier 91 facility was conducted on 28 March 1988. Site representatives for Chempro were Mr. Nate Mathews, Facility Manager, and Mr. Keith Lund, Compliance Specialist. The Tetra Tech, Inc. investigators were Mr. David Kleesattel and Mr. Brian O'Neal. A preliminary meeting was conducted to discuss the facility's history and operations. The site representatives discussed each waste management unit including waste characteristics, storage and treatment activities, maximum capacity, waste discharge and disposal.

The Chempro representatives conducted a tour of the facility and all waste management units. Questions and concerns regarding each unit were answered by site representatives during the tour. Photographs of the facility and waste management units were taken while touring the facility.

A closing meeting was conducted following the facility tour to identify and discuss remaining information and data gaps. The Chempro representatives agreed to supply information regarding past spill events, the 1987 Hazardous Waste Annual Report, and well logs from Chempro's recent groundwater investigation. The information was forwarded to Tetra Tech on 30 March 1988.

1.3 AVAILABILITY OF DATA/DATA GAPS

There was very little available information on the geology and hydrogeology of the Pier 91 industrial complex. The area was developed by adding fill material on top of tidal flat sediments. The groundwater is not used for domestic or industrial purposes. Therefore, information regarding parameters such as groundwater flow gradients, tidal influence on the aquifer, and soil permeability was not available.

Information gathered from PSAPCA was not specific to the Chempro, Inc. operation. The inspections performed by PSAPCA at Chempro Pier 91 focused only on boiler-stack emissions from the Pacific Northern Oil Company steam boiler. The past inspections have not included monitoring for air releases

of petroleum associated, volatile organic compounds (Austin, F., 25 April 1988, personal communication).

Analytical data required for complete facility assessment was not obtainable from Chempro, Inc. The facility does not fully analyze all waste streams. The incoming waste is screened for general parameters such as total chloride, bottom sediment and water, and flashpoint. Other constituents such as heavy metals are not determined. The treated wastewater is analyzed for heavy metals, phenol, oil and grease, and pH (as per their Metro discharge permit). The waste sludge is not analyzed at Pier 91. The sludge is manifested as hazardous waste solid, not otherwise specified. The waste stream from the coolant treatment is also not analyzed before transport to Chempro, Lucille Street, Seattle. This materials is manifested as hazardous liquid waste.

Chempro has recently completed a soil and groundwater contaminant evaluation study (December 1988). The purpose of this study was for an internal facility assessment prior to Burlington Northern's purchase of the facility. This transaction was completed in early March 1988. The results of this study would be extremely useful for this RCRA Facility Assessment. However, Chempro did not wish to release the analytical findings of their study prior to submitting a formal document to U.S. EPA Region X. Therefore, groundwater chemical analysis information was not available at the time of preparing this RFA.

The PR did not reveal any previous groundwater investigations in the Chempro Pier 91 vicinity. However, several wells not installed by Chempro (B101, B102, and Station 10) exist at the facility. The Port of Seattle Engineering Department and Chempro representatives did not have any information regarding the history of these wells.

1.4 PROJECT CONCLUSIONS

The RCRA Facility Assessment requires the interpretation of environmental data to evaluate contaminant release, migration, and exposure

potential. The available information (well and soil boring logs) suggest that the soil underlying the Chempro facility is relatively permeable. The soil consists of varying amounts of sand and gravel. This type of soil will allow liquid contaminants, such as petroleum and wastewater, to migrate easily to the groundwater. The well logs (see Appendix B) indicate that the water table aquifer fluctuates between 3 and 7 ft below surface.

The groundwater appears to be influenced by nearby (approximately 200 ft) Elliott Bay. The U.S. EPA Preliminary Assessment (U.S. EPA 1985) states that the groundwater is brackish. This suggests direct communication with the saline waters of Elliott Bay. This connection between the aquifer and Elliott Bay further suggests that contaminants originating from Chempro can migrate into the Puget Sound. The groundwater level measurements (Appendix B) indicate a flow direction to the south-southwest towards Elliott Bay.

The tidal influence on the local groundwater most likely causes a high degree of contaminant mixing (by hydraulic gradient fluctuation) beneath the site. Therefore, it would be extremely difficult if not impossible to identify the source for existing groundwater contamination with the present monitoring system. The existing wells are adequate to determine hydraulic gradients and tidal influence. A soil boring program such as that described in Sections 1.5 and 5.5.4 of this report would be necessary to identify specific contamination point sources.

Relatively permeable soils combined with a shallow water table make it likely that in the past large spills on the bare soil have reached the groundwater. Some preliminary evidence for groundwater and soil contamination was found in the borehole logs collected in late 1987. These facts coupled with a hydraulic gradient towards Elliott Bay indicate that groundwater is the major pathway of concern for past spills. The marine life in the bay is potentially at risk from past waste releases from Chempro. There are no producing groundwater wells within 0.5 mi of the site.

Records indicate that significant quantities of waste oil and wastewater have been released from the Chempro facility. The largest of these spills

(in 1979) released an estimated 420,000 gal of waste oil onto the unpaved in the Marine Diesel Oil (MDO) Yard. Cleanup efforts apparently removed several cubic yards of soil. However, there are no records indicating any investigations to determine whether the remedial activities were successful in removing all contaminated soil. The presence of contamination in downgradient Wells CP-103 A & B suggest that contaminants from the MDO Yard have entered the aquifer.

Since the site has been completely paved (1986) the only mechanism by which future spills could enter the soil and groundwater would be through cracks in the pavement. This is potentially a significant problem if cracks occur beneath leaking tanks. The present daily tank inspection and lack of overflow alarms or automatic shut-off system is inadequate to detect leaks and minimize the potential for a release.

Air is also a potential pathway of concern for some of the more volatile petroleum and petroleum distillate compounds. The quantity of volatile organic compounds handled onsite is small. However, without analytical documentation to suggest otherwise, it was assumed that releases of volatile compounds is possible by normal operating practices. Because the anticipated emissions of organic compounds is low, the receptors of air contamination are restricted to Chempro employees only. The air pathway should be considered only as a potential occupational hazard.

Surface water is not considered a potential pathway of concern. All onsite surface water drains to Chempro's treatment process. Subsurface gas is not a migration pathway of concern because of the nature of potential contaminants.

1.5 PROJECT RECOMMENDATIONS

Chempro does not have an adequate tank testing program. The daily visual inspections may not detect leaks through the bottoms of the tanks (see Section 5). Significant quantities of wastes could be leaking into the permeable underlying soil. Therefore, it is recommended that Chempro

implement a tank leak-testing program. The tanks should be tested on an annual basis to ensure continued tank integrity.

The facility should install overflow alarms on all tanks that are operated with open vents (units 3,4,5,7,10,11,12,13, and 15). Several past spills have been the direct result of tank overfilling (units 3 and 4). The facility manager indicated that an alarm system was soon to be tested on several tanks. If this system proves to be successful, it should be installed on all Chempro tanks.

The groundwater level monitoring information gathered by Chempro is inadequate to fully evaluate aquifer characteristics such as hydraulic gradients, permeability, and tidal influence. It is recommended that Chempro initiate a groundwater monitoring program with existing wells. This study should include quarterly monitoring to determine seasonal groundwater level variation and tidal influence on local hydraulic gradients (see Section 5.5.4).

As mentioned previously, the list of analytes and their concentrations in groundwater samples collected by Chempro were not available. When this information becomes available, the data should be analyzed for evidence of groundwater contamination. The analytes should include at a minimum volatile organic compounds, base-neutral acid (BNA) extractable compounds, and heavy metals. If Chempro's existing groundwater analytical program does not include the above analytes, additional sampling and analysis should be conducted to fill in the data gaps. These results should be used to design a more extensive soil and groundwater sampling program.

High priority should be given to conducting soil and groundwater sampling in the Marine Diesel Oil Yard to determine the nature and extent of contamination. The spills in this area prior to paving in 1986 have most likely contributed significant quantities of oily contaminants to the soil and groundwater (see Section 5.5). The study should also include an evaluation of potential aquifer contamination caused by migration of the contaminants presently in the soil.

2.0 DESCRIPTION OF FACILITY AND WASTE GENERATED

2.1 FACILITY DESCRIPTION AND HISTORY

The Chemical Processors, Inc. operate a waste oil treatment and recovery facility at Pier 91, located on the northern waterfront of Elliott Bay (see Figure 1). The 4 ac facility was originally owned and operated by Texaco, Inc. in the 1920s. Texaco transferred ownership to the U.S. Navy during World War II, with the City of Seattle operating the facility. The Navy later transferred ownership to the city. In 1971, the City of Seattle leased the facility to Chempro (Chemical Processors, Inc. 1987a). In turn, Chempro subleases approximately 60 percent of the Pier 91 treatment and storage complex to Pacific Northern Oil Company (PANOCO) for use as a marine fuel depot (Chemical Processors, Inc. 1987b). All of the oil treated and recovered by Chempro is sold to PANOCO.

The Chempro process system recovers oil from oily wastes (e.g., oily sludges, emulsified oil and water, waste machine oil, and oily water) and also treats wastewater and spent coolant contaminated with low concentrations of heavy metals and phenols (Chemical Processors, Inc. 1987c). The waste types treated include:

- Dirty/oily bilge water
- Pretreated oily wastes from other Chempro facilities
- Oily industrial wastewater, not otherwise specified (NOS)
- Spent industrial coolants (phenolic and non-phenolic)
- Waste machine oil from local automotive shops.

Soil and groundwater samples should also be collected from the other tank yards, storm water sump, and in the immediate vicinity of the oil water separator. The soil boring program should be designed to determine the lateral extent of contamination. Because tidal influence on groundwater (and subsequently contaminant) movement is suspected, the soil boring program should not attempt to identify contaminant sources. Soil samples should be collected along the perimeter of the facility and from each of the bermed tank yards (both upgradient and down gradient locations). An estimated 15 soil borings would be required. The samples should be collected from discrete vertical intervals from the surface to within the saturated zone. The exact sample interval will be determined based on lithology and sampling technique.

The Chempro Pier 91 treatment and storage facilities have a maximum capacity of approximately 8.5 million gal (including PANOCO storage). The waste materials are delivered to the facility via independently owned and operated barges and tank trucks. Chempro has not received any wastes from barges for over 1 yr. The treatment and recovery processes involve oil/water separation, thermal and chemical oxidation, precipitation, and centrifugation (Chemical Processors, Inc., 1986). These processes are discussed in further detail in Section 5 of this report.

The Chempro Pier 91 facility consists of an approximately 4-ac site (see Figure 2). The facility is completely paved and contains both asphalt and concrete areas. The concrete paving of the storage tank areas was completed in 1986. The concrete pavement in the vicinity of the oily wastewater truck off-landing area has several major cracks with separation gaps approximately 0.75 in wide (see Photo 5). The Black Oil and Marine Diesel Oil Yards are fully enclosed by a 15-17 ft masonry wall. The small storage and treatment yard is surrounded by a 5 ft masonry containment wall. All waste transfer is performed in above ground pipes. The process and storage areas outside the containment walls are secured by a chain-link fence, topped with barbed wire strands. The exceptions to this are the oily wastewater truck off-loading and oil/water separator areas located in the northwest quadrant of the facility (see Figure 2). Personnel from nearby industrial businesses other than Chempro, could potentially access these areas. The entire Pier 91 industrial complex has a guarded security gate and restricted entry. Therefore, the general public cannot gain access to the Chempro facility.

Chempro has a close working relationship with the subleasee, Pacific Northern Oil Company (PANOCO). Chempro provides oily wastewater treatment and waste oil recycling service to PANOCO (Mathews, N., 28 March 1988, personal communication). The recycled oil is sold back to PANOCO. The steam required for Chempro's thermal treatment process is generated by a PANOCO operated boiler located in the main warehouse. The PSAPCA air monitoring inspections conducted at the Chempro Pier 91 facility have focused on the emissions from PANOCO's boiler. The PSAPCA inspection this

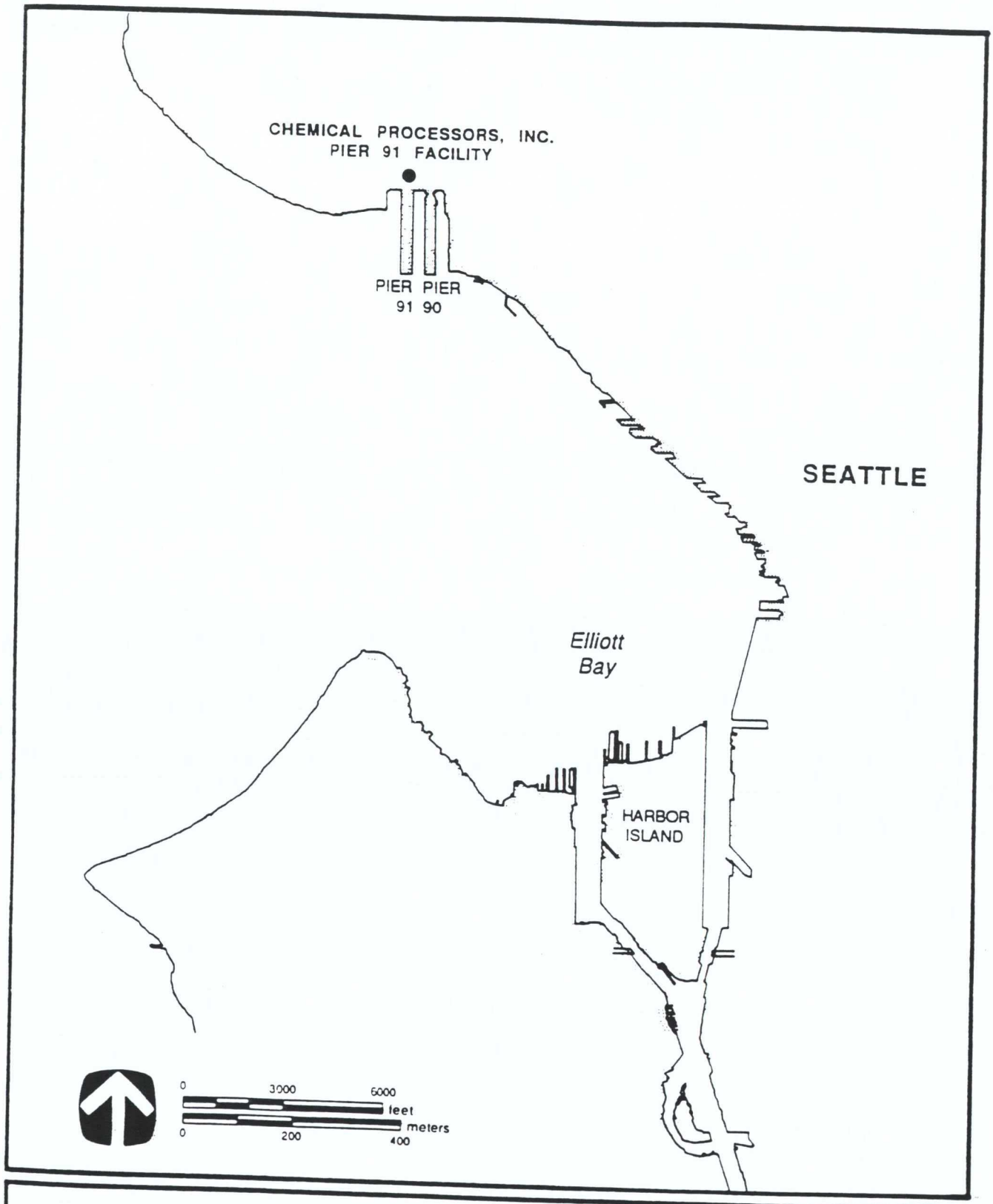


Figure 1. Location map of Chempro Pier 91 facility.

records do not specify any emissions originating from Chempro, Inc. processes. PSAPCA has issued over 10 violations to the Chempro Pier 91 facility since 1976. However, all of these violations have been the result of PANOCO's boiler stack emissions.

The onsite surface drainage is designed so that no surface runoff leaves the facility without first being treated. The treated water is discharged to the Metro sewer system (Permit No. 7099-R09/84-2). The facility has a storm water sump system which collects surface runoff from all areas except those contained within the bermed tank yards (see Section 5.1.7 of this report). The surface runoff in each of the individual tank yards drains to blind sumps within the containment areas. The water collected in these sumps is pumped into the Chempro water treatment system.

Chempro has recently implemented a soil sampling and groundwater analysis study. The results of the analyses were not available for evaluation at the time this report was prepared. Chempro is currently preparing a document with the results. Their report will be submitted to U.S. EPA Region X later this year. Preliminary data such as groundwater level measurements and soil boring logs were complete (see Appendix B). An evaluation of the well construction and water level measurements is presented in Section 2.3 and 2.4 of this report.

2.2 WASTES GENERATED

Chempro Pier 91 generates hazardous waste sludges from the thermal, chemical, and physical treatment of waste oil and oily wastewater. The sludges potentially contain significant concentrations of EP toxic constituents (e.g., lead and chromium) and volatile organic compounds associated with petroleum products. The waste sludge is transferred to the Lucille Street Chempro facility and eventually disposed of at the Chem Security Systems, Inc. landfill in Arlington, OR. The Pier 91 facility does not analyze the waste sludge prior to shipment to the Lucille Street facility. The sludge is manifested as hazardous waste solids not otherwise specified (NOS). The composition of the sludge is within the concentrations given in

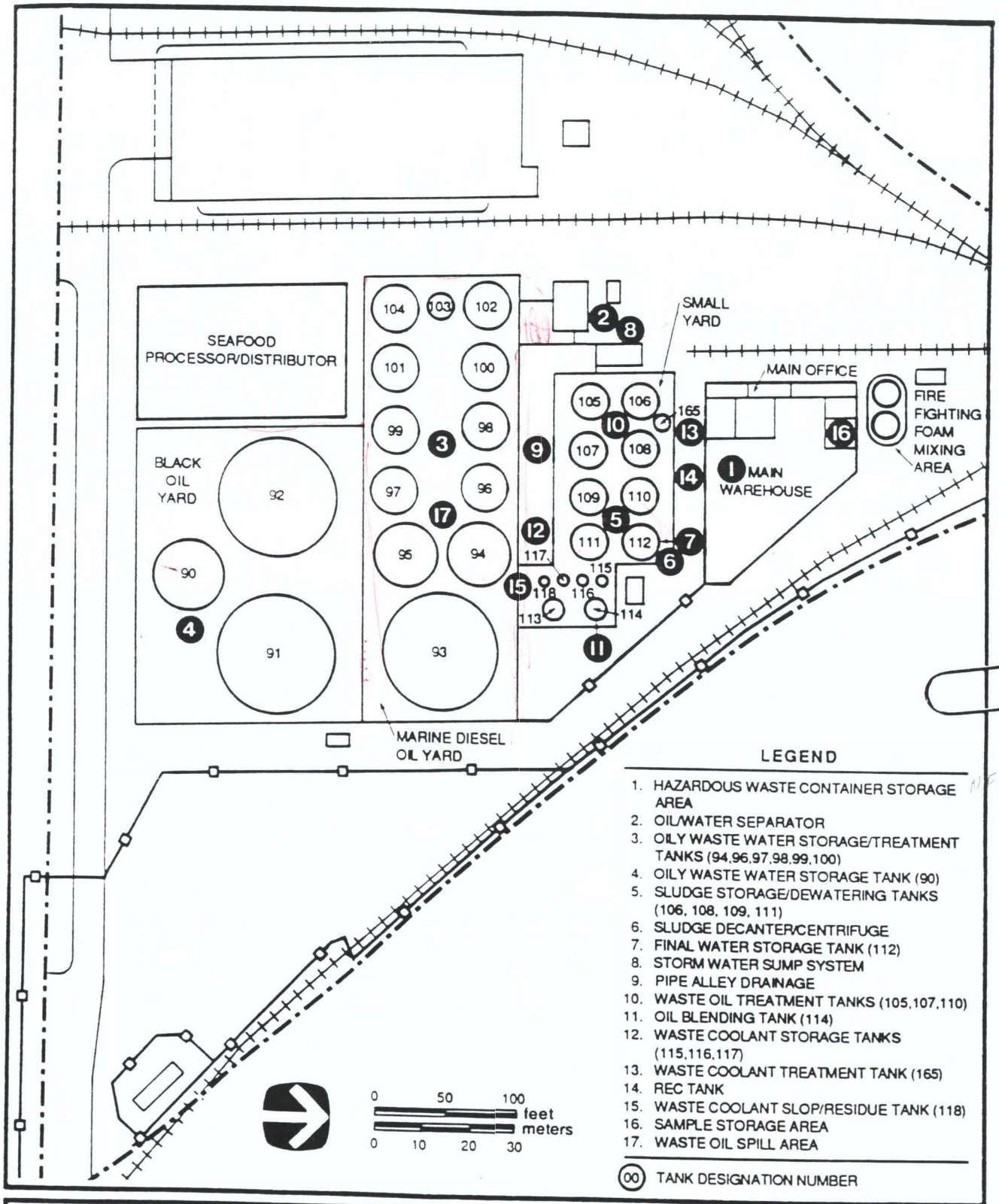


Figure 2. Map of RCRA-regulated and Solid Waste Mangement Units at the Chempro Pier 91 facility.

the waste profile data (see Appendix C). Therefore, the exact hazardous waste characteristics of the sludge are unknown at this time. Chempro has recently implemented an analytical program to determine the exact nature of the sludge currently stored in Tanks 106, 108, 109, and 111 (Mathews, N. 28 March 1988, personal communication). These initial analytical results will be included in a facility report submitted by Chempro to U.S. EPA Region X later this year.

The residues produced from the thermal and chemical treatment of phenolic and non-phenolic coolants are temporarily stored on site (Tank 118). This residue (coolant slop) is transported to the Chempro Lucille Street facility, and used as an alternative fuel. The coolant slop is manifested as a hazardous waste for shipment to Lucille Street. This material is not analyzed by Chempro Pier 91 (Mathews, N. 28 March 1988, personal communication). Therefore the exact nature of this material is unknown at this time.

2.3 ENVIRONMENTAL SETTING

2.3.1 Climate

The climate in Seattle, Washington along the northern shore of Elliott Bay is moderate. The annual precipitation is approximately 35 in. Late autumn and winter are the wettest seasons. The average maximum daily temperatures range from 35^{0} F in January to near 70^{0} F in July and August.

2.3.2 Geology/Hydrogeology

The Pier 91 industrial complex is underlain by anthropogenic deposits of unsorted and unstratified material. This material consists of clay, silt, sand, and gravel originating from dredgings from Elliott Bay and regrading activities in King County, Washington. The majority of the pier construction occurred in the early 1900s. The man-made fill material ranges from 0 to approximately 60 ft in thickness and is underlain by quaternary tidal flat

deposits of clay, silt, and sand (Wells, R., 31 March 1988, personal communication).

The hydrogeology of the Pier 91 area is poorly understood. The fill material is generally poorly sorted (ranging from silt to coarse gravel). Because of the man-made deposition, well defined stratification of the material into laterally continuous layers is unlikely. The well logs from the nearby monitoring wells indicate a significant amount of sand and gravel overlying the quaternary tidal deposits (see Appendix B). The coarse nature of the material probably produces a relatively high permeability. The fill material most likely behaves as a tidally influenced, unconfined aquifer. Further hydrogeologic tests would be necessary to fully characterize the Pier 91 vicinity.

The groundwater in the Pier 91 area occurs approximately 3 to 7 ft below the ground surface (U.S. EPA 1985). The groundwater is described as being characteristically brackish contains a dissolved salt content between freshwater and saltwater. There are no producing groundwater wells within 0.5 mi of the Chempro Pier 91 facility (Kautz, M., 7 April 1988, personal communication). Chempro currently maintains six groundwater monitoring wells on site (see Figure 3).

The preliminary groundwater information collected by Chempro (December 1987; see Appendix B, Table 3.1) suggests that the groundwater flow direction is to the south-southwest towards Elliott Bay. This data from the well clusters located at CP-103 and CP-105 indicate a downward vertical gradient. However, it needs to be noted that this preliminary data was collected during a short time interval (2 days) and does not reflect seasonal fluctuations. Also, the time of measurement is not given. Groundwater variations induced by tidal activity cannot be evaluated at this time. Additional water level measurements need to be taken to determine seasonal and tidal influence on the local groundwater flow regime. For the purpose of this report, it is assumed that the groundwater flow direction is generally to the south-southwest.

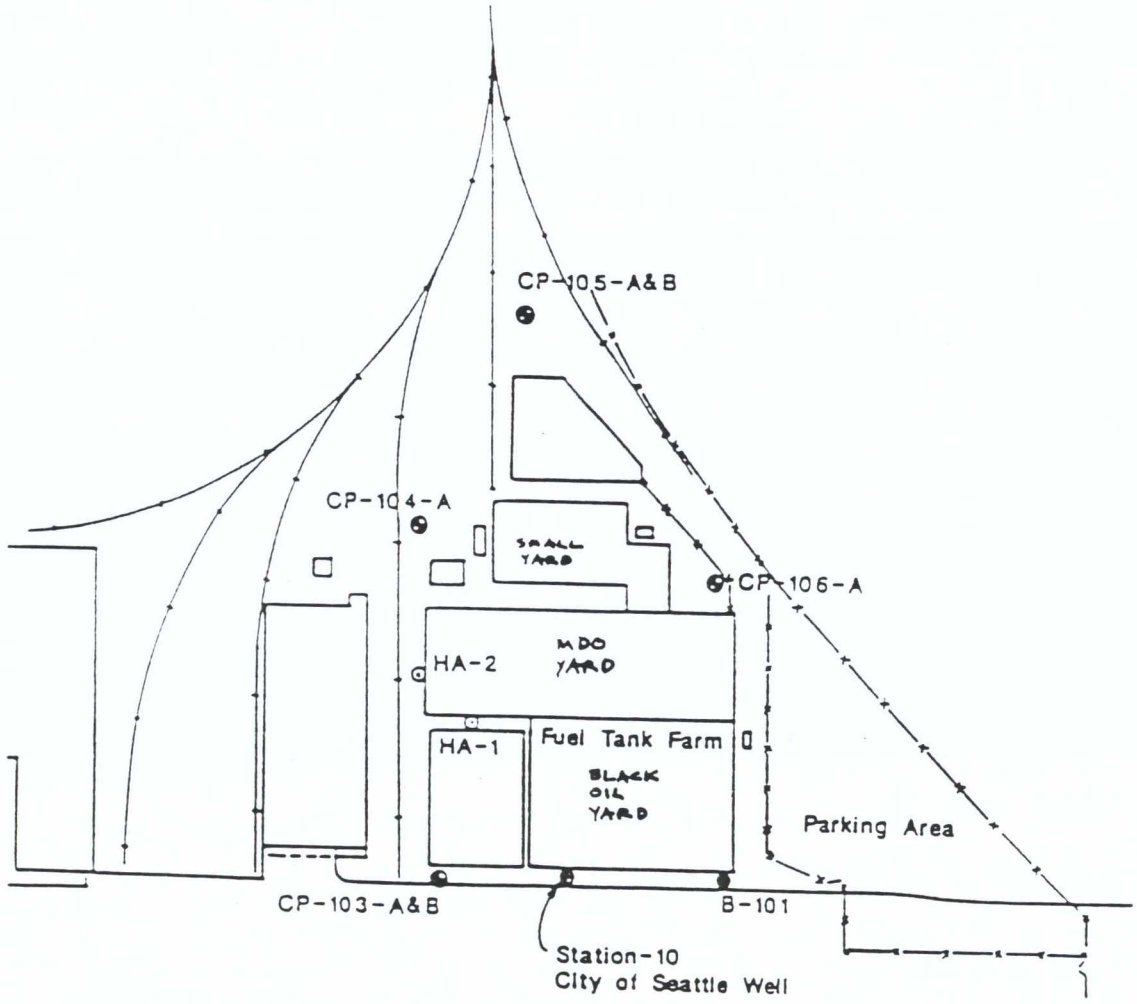


Figure 3. Map of groundwater wells at the Chempro Pier 91 facility.

2.3.3 Surface Water

The Chempro Pier 91 facility does not have any off-site surface drainage to local surface waters (Mathews, N., 28 March 1988, personal communication). There are no permanent streams or rivers in the immediate vicinity of the Chempro facility. The nearest surface water is Elliott Bay. The shore of the bay is approximately 200 ft from the Chempro facility (USGS 1983).

2.4 GROUNDWATER MONITORING SYSTEM

Chempro installed six groundwater monitoring wells in late 1987 (Lund, K., 30 March 1988, personal communication). The locations of these wells are shown in Figure 3. Soil samples were collected as part of the well installation activity. Boring logs, lithologic descriptions, well construction designs, and a water level summary are included in Appendix B.

The groundwater at the Chempro Pier 91 facility is shallow, ranging from 3 to 7 ft below the surface. The CERCLA Preliminary Assessment (PA) states that the groundwater is 3 ft deep. The recent Chempro data shows the water level as 6 to 7 ft below the surface. This discrepancy may reflect seasonal variation, recent drought conditions or tidal influence. The PA was conducted in March 1985, whereas the most recent information was collected in December 1987. The groundwater is brackish which suggests tidal influence and direct communication with nearby Elliott Bay.

The construction design of the monitoring wells generally appears to be adequate to intercept oily contaminants migrating from the facility. The construction details for Well CP-104-A are not included with the boring log. The adequacy of this well could not be fully evaluated. No product odor was noted in Wells CP-105-A & B during installation.

Monitoring Wells CP-105 A and B may be adequately located for use as upgradient (background) wells. However, additional water levels need to be taken and the tidal influence assessed to ensure these wells remain

upgradient throughout the year. Also, analytical data needs to be obtained to prove that no contaminants are present in these wells. The wells located at CP-103, and possibly CP-104, should intercept contaminants migrating offsite (downgradient). The boring logs indicate a product odor in the soil at both these locations. Analytical results from samples collected in December 1987 will determine whether Chempro activities have adversely affected the aquifer quality.

The water levels in Monitoring Well CP-106 (December 1987) suggest that this well is hydrologically upgradient of the Chempro units (see Appendix B). However, a product odor was detected in the soil during well installation. This suggests that the groundwater elevations may be in error. Alternatively, groundwater mounding under the Marine Diesel Oil Yard, prior to the paving in 1986, may have allowed spilled waste oil to migrate to the vicinity of CP-106. Regardless, this well should not be used as a background well.

3.0 LOCATIONS OF RCRA-REGULATED UNITS AND SOLID WASTE MANAGEMENT UNITS

One RCRA-regulated unit and 16 solid waste management units (SWMUs) were identified during the PR and VSI of the Chempro Pier 91 facility in Seattle, WA. The RCRA-regulated unit is defined as:

- Unit 1. Hazardous Waste Container Storage Area.

The 16 SWMUs are:

- Unit 2. Oil/Water Separator
- Unit 3. Oily Wastewater Storage/Treatment Area
- Unit 4. Oily Wastewater Storage/Treatment Tank 90
- Unit 5. Sludge Dewatering/Storage
- Unit 6. Sludge Decanter/Centrifuge
- Unit 7. Final Water Storage Tank
- Unit 8. Storm Water Sump System
- Unit 9. Pipe Alley Drainage
- Unit 10. Waste Oil Treatment Tanks
- Unit 11. Oil Blending Tank
- Unit 12. Waste Coolant Storage Tanks

- Unit 13. Waste Coolant Treatment Tank
- Unit 14. Rec Tank
- Unit 15. Waste Coolant Slop/Residue Tank
- Unit 16. Sample Storage Area
- Unit 17. Waste Oil Spill Area

The locations of these units are shown in Figure 2. Locations of groundwater monitoring wells at the Chempro Pier 91 facility are shown in Figure 3. Descriptions of these units are provided in Sections 4.0 and 5.0 of this report.

4.0 RELEASE INFORMATION FOR RCRA-REGULATED UNITS

A discussion of the RCRA-regulated hazardous waste management units at the Chempro Pier 91 facility is provided in this section.

4.1 UNIT 1. HAZARDOUS WASTE CONTAINER STORAGE

4.1.1 Description

The hazardous waste container storage area, located within the main building (#19) on the Pier 91 Facility (see Figure 2) is approximately 200 ft^2 in area and consists of an unbermed, concrete floor (see Photos 26-28). The hazardous wastes (sludges) are stored in 55-gal drums and are all marked with appropriate labels. Labels were examined during the VSI and it was noted that the labels do not indicate the date of accumulation or storage (see Photo 29). Several of the drums were either severely damaged or stored open. The facility does not routinely inspect this area or have any records indicating the length of storage time at that site (Mathews, N., 28 March 1988, personal communication). The plant manager indicated that these particular hazardous wastes have been stored there for at least 1 year.

Chempro is in the process of removing the existing hazardous waste drums from the facility. The waste sludges are first transferred to the Chempro Georgetown (Lucille Street) facility, then disposed of at Chemical Security Systems, Inc. (CSSI) located in Arlington, OR. Pier 91 has not generated any drummed, waste sludges for approximately one year. At the time of the visual site inspection, 13 drums of waste sludge were being stored in the designated hazardous waste container area. Facility personnel indicated that up to 160 drums have been stored in this area at one time (Mathews, N., 28 March 1988, personal communication).

4.1.2 Waste Characteristics

The hazardous wastes stored in drums consist of sludges generated by the thermal treatment of waste oil and by gravity induced oil/water separation. The sludges are prepared for transportation by a mechanical decanter/centrifuge process. The decanter has not been operated since mid-1987. The waste sludges generated during the Chempro treatment processes typically contain significant concentrations (>500 ppm) of heavy metals such as chromium and lead (lead 0-10,000 ppm and chromium 0-1,000 ppm; see Appendix C). The sludges are not analyzed prior to transportation to the Lucille Street Chempro facility. Therefore, there are no analytical data sheets to determine the concentration of specific constituents in the waste sludge. The waste profile data are tabulated in Appendix C. The composition of the sludge will be within these profile value ranges (Mathews, N., 28 March 1988, personal communication).

4.1.3 Migration Pathways, Evidence of Release, and Exposure Potential

The hazardous waste storage area is isolated from groundwater and surface water migration pathways by the concrete floor and controlled surface drainage (see Photos 26-28). To date, there has been no evidence collected which indicates contamination has been released from this unit. At the time of the VSI, one drum was apparently leaking (see Photo 27). However, the plant manager indicated that recent precipitation had leaked into the warehouse, and the water near the drums was the result of rain water drainage. There were no other obvious chemical stains caused by drum leakage on the floor. Subsurface gas is not a potential pathway of concern because of the nature of the waste.

Air is a pathway of slight concern, because one drum was partially opened and particulate material could escape from the container. Typically this unit would not produce potentially hazardous vapors because of the very low volatility of the hazardous waste constituents (heavy metals). If all drums are stored properly (e.g., sealed), air would not be a potential pathway of concern. The only receptors for the air pathway are the Chempro

employees. Surface water is not a pathway of concern because the area is located inside a building and all potential surface drainage in this area is directed to the storm water sump system (see Section 5.1.7).

4.1.4 Conclusions and Recommendations

No further action under the RFA/RFI process is recommended for the hazardous waste container storage area. However, wastes contained in damaged or leaking drums need to be repackaged in proper containers. Drums which contain hazardous waste should not be stored opened. An inspection schedule needs to be implemented for the hazardous waste container storage area as required under interim status regulations (40 CFR Part 265 Subpart I). These inspections would be useful in identifying problems associated with waste storage such as leaking waste drums, improperly covered drums, or drums that are stacked inappropriately.

5.0 RELEASE INFORMATION FOR SOLID WASTE MANAGEMENT UNITS

A discussion of the 16 SWMUs at the Chempro Pier 91 facility is presented below.

5.1 OILY WASTEWATER TREATMENT

The oily wastewater treatment system is used to treat incoming waste from off-site industrial locations. This system is also used to treat all on-site surface water drainage, and oily wastewater from the adjacent PANOCO activities. A summary of the wastewater treatment process is given in Figure 3. The incoming wastewater is analyzed (screened) for a number of waste characteristics prior to being off-loaded into the Chempro treatment system (see Figure 4). The initial screening analysis includes tests for total chlorides, phenol, pH, emulsification, and flashpoint. Waste with total chlorides greater than 1,000 ppm is rejected. The rejected wastewater is either returned to the generator or transported to the alternative facility as indicated on the manifest. The determination whether the wastewater is oily or non-oily is performed by a visual examination (Mathews, N., 28 March 1988, personal communication). Wastewater containing phenol and coolant is pumped to the phenolic isolation/treatment system (see Section 5.3 of this report). The wastewater that is classified as non-phenolic and non-oily is pumped directly to the wastewater storage and treatment tanks. All non-phenolic, oily wastewater is off-loaded directly to the oil/water separator.

Oil collected from the oil/water separator is pumped into the oil treatment tanks (see Section 5.2 of this report). The water fraction is pumped to the water storage and treatment tanks (see Figure 4). The treatment includes gravity dewatering, thermal treatment, and precipitation. Waste oil, emulsified liquids, and sludge is produced during treatment. The oil and emulsified liquids are treated in the oil treatment tanks (105, 107, and 110). The sludge is dewatered in the decanter/centrifuge unit. The

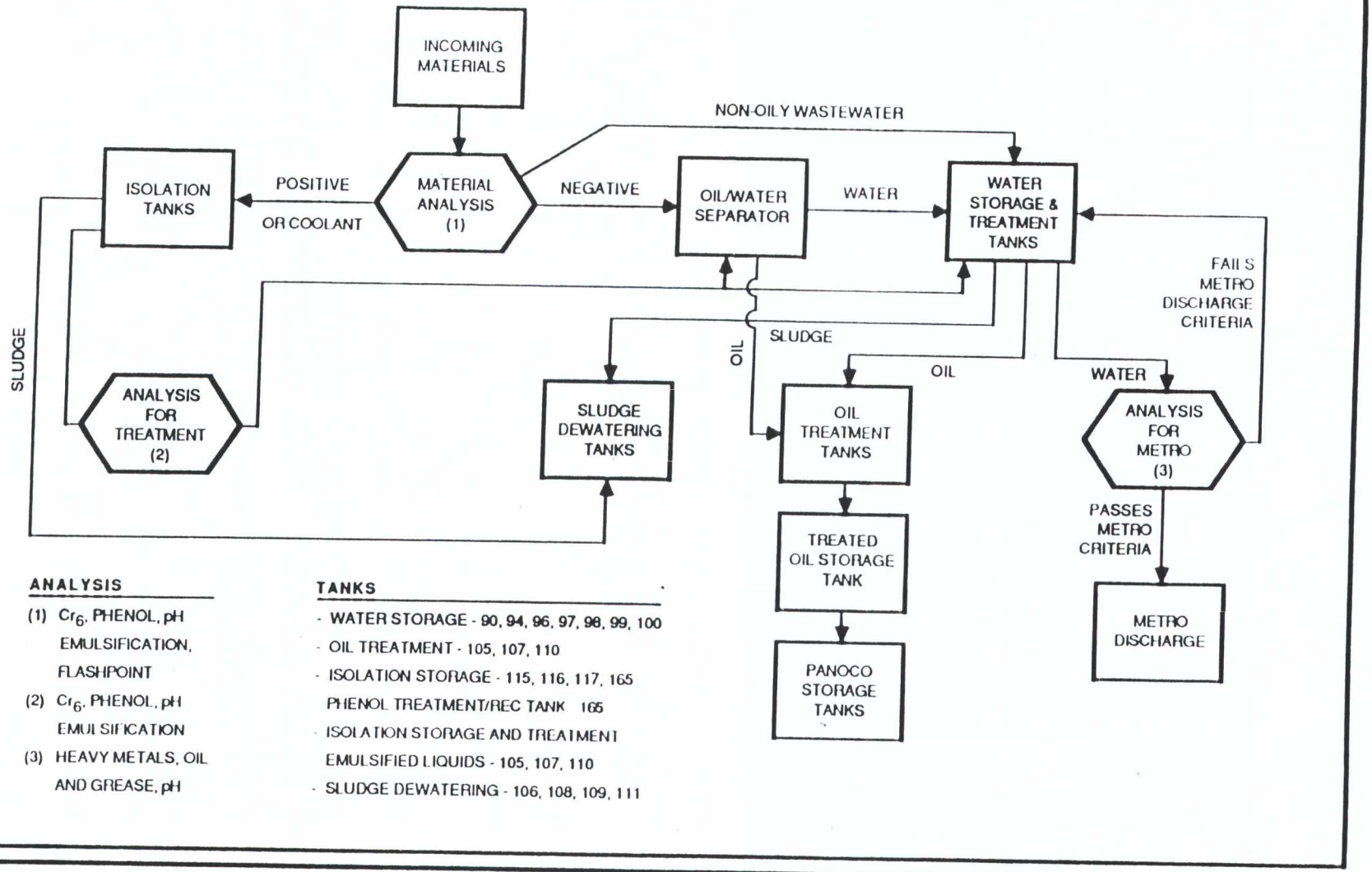


Figure 4. Flow diagram of the Chempro Pier 91 oily and non-oily wastewater and coolant treatment process.

treated wastewater is tested against the Metro sewer discharge permit parameters. If the wastewater meets the Metro criteria, the water is transferred to Tank 112 to await discharge to the sewer system. Any wastewater not meeting the discharge criteria is pumped back into the wastewater storage and treatment tanks. The Metro discharge permit standards are as follow:

Oil and grease	100 ppm
pH	5.5-12.5
Cadmium	3.0 ppm
Chromium	6.0 ppm
Copper	3.0 ppm
Nickel	6.0 ppm
Lead	3.0 ppm
Zinc	5.0 ppm

The facility slope is designed to prohibit offsite surface water drainage. There are five separate storm water collection areas. Each of the three bermed tank yards have separate blind sumps. When the sumps are full, pumps are manually started and the water is transferred to the oily wastewater treatment system. These blind sumps are not interconnected and will not release storm water from the facility.

Oil contaminated storm water also collects in the Chempro and PANOCO pipe alleys (see Photos 11 and 25). These two pipe alleys are adjacent, but behave as discrete units. Oily water in both these units is pumped into Chempro's oil/water separator.

The on-site storm water drainage, outside the contained areas, is collected in a sump system (see Photos 5 and 6). This system is separate from the tank yard blind sumps, pipe alleys, and sewer discharge system. The storm water is collected in a brick-lined sump located immediately northeast of the oil/water separator. The storm water is pumped directly into the oil/water separator for treatment. This system does not allow off-site drainage to surface water.

Eight solid waste management units make-up the oily wastewater treatment process:

- Oil/water separator
- Oily wastewater storage/treatment area
- Oily wastewater storage/Treatment Tank 90
- Sludge dewatering/storage
- Sludge decanter/centrifuge
- Final water storage tank
- Storm water sump system
- Pipe alley drainage.

Detailed description for each of the above SWMUs are presented below. The analytical data from the groundwater, soil, and sludge dewatering tank sampling were not available at the time this report was prepared. The data is forthcoming from Chempro and will be integrated into the final report.

5.1.1 Unit 2. Oil/Water Separator

5.1.1.1 Description--

The oil/water separator is located in the northwest quadrant of the facility immediately adjacent to the truck off-loading area (see Figure 2). The capacity of this unit is approximately 40,000 gal (Mathews, N., 28 March 1988, personal communication). The separator is constructed of concrete and is completely recessed within the surrounding pavement. The unit is completely covered with a steel grating (see Photo 4). The grating prohibits

objects from falling into the unit. A blind sump trough is located between the oil/water separator and the main access road to the west. The trough is approximately 12 in deep and 8 in wide. Oily water from this trough is manually pumped into the oil/water separator. The capacity of this blind sump would be inadequate to contain a major spill during oily wastewater off-loading. However, the facility slope would prevent off-site migration via a surface water pathway.

Incoming oily wastewater is pumped directly into the oil/water separator from bulk tank trucks (see Photos 2 and 3). Surface water drainage is collected in the adjacent sump to the east of the separator. The contents of this sump are pumped directly into the oil/water separator (see Photo 5).

5.1.1.2 Waste Characteristics--

The oil/water separator contains oily wastewater contaminated with heavy metals such as lead, hexavalent chromium, and zinc. Volatile organic compounds may also be present in the separator. The facility does not routinely analyze the oil/water separator constituents (wastewater and oily sludges).

5.1.1.3 Migration Pathways, Evidence of Release, and Exposure Potential--

Groundwater and soil are potential pathways of concern in the event of cracking and leaking at the oil/water separator. There are no records indicating any leaks or spills from this unit. The groundwater is shallow, approximately 5 ft, and the native soil in the vicinity is sand (see Appendix B, Well Log CP-104). Contamination has been observed in the downgradient wells CP-103 A and B and in well CP-104 located 50 ft to the west of this unit (see Figure 3 and Appendix B). The facility has no record of inspection of the separator. The exact age and construction design of the unit is unknown. The concrete pavement in the general vicinity shows signs of significant failure (see Photo 5). There are no human receptors which use the groundwater within 0.5 mi (Kautz, M., 7 April 1988, personal communication). However, the groundwater flows into Elliott Bay approxi-

mately 200 ft to the south of the site. Contaminant release into the bay could potentially affect marine organisms.

Air is a potential pathway of concern. Volatile constituents associated with petroleum products (e.g., benzene) can be released from the oil/water separator. There were no monitoring records at this unit to evaluate ambient air quality. The air pathway should only be considered as a potential occupational hazard and not a source for extensive environmental contamination because of the low volatile organic compound concentration and high potential for wind dispersion of any emissions. The primary receptors of concern within 0.5 mi include the ten Chempro employees.

Surface water is not a pathway of concern because all facility drainage is to the stormwater sump system (see Section 5.1.7). Subsurface gas is not a pathway of concern at the oil/water separator because the compounds contained within this unit would not be expected to generate dangerous (explosive) subsurface gases during degradation and volatilization.

5.1.1.4 Conclusions and Recommendations--

The most recent analytical groundwater data need to be evaluated. This data is to be submitted by Chempro to U.S. EPA Region X in the near future. Because this information was not released prior to the preparation of this report, the evaluation could not be presented here. Monitoring Wells CP-103 and CP-104-A may be adequate to detect contaminant migration from the oil/water separator. However, the construction details are not included on the well log. If significant contamination is detected in monitoring well CP-104-A, and the contaminant characteristics match expected wastes from the oil/water separator, a groundwater monitoring program should be designed and implemented to determine the extent of contamination in the soil and groundwater in this area (see Section 5.5.4 for specific recommendations). The absence of detectable contaminants in Well CP-104-A should not be used as evidence for no release until the groundwater flow direction has been established. The facility should drain the oil/water separator and inspect the unit for cracks or evidence of concrete fatigue.

5.1.2 Unit 3. Oily Wastewater Storage/Treatment Area

5.1.2.1 Description--

The oily wastewater storage/treatment area is located in the Marine Diesel Oil (MDO) yard (see Figure 2). The area consists of six mild steel tanks having the following capacities:

Tank	Capacity (bbl)
94	10,189
96	6,212
97	6,282
98	6,401
99	6,019
100	6,477.

The total capacity is 41,580 bbl (1,746,360 gal). The tanks have plate steel bottoms and are constructed on concrete foundations. The construction date and specific design of these tanks is unknown. The tanks are equipped with internal steam lines used to heat the contents to 190^{0} F. The area surrounding the tanks is completely paved with concrete (completed in 1986). The MDO yard is surrounded by a 15 ft containment wall. The facility has no record of tank leak testing since Chempro leased the property in 1971. Visual tank inspections are performed daily, and an inspection log is kept in the main office. The top vents of all tanks are kept open. None of the tanks have alarms or automatic shutoffs to prevent overfilling.

5.1.2.2 Waste Characteristics--

The tanks contain only wastewater contaminated with heavy metals such as lead, hexavalent chromium, and zinc. This waste stream is not analyzed and concentrations of contaminants are unknown. Low concentrations of volatile organic compounds may be present in the wastewater.

5.1.2.3 Migration Pathways, Evidence of Release, and Exposure Potential--

Groundwater and soil are potential pathways of concern. The tanks have not been leak-tested for at least 17 yr. The tank bottoms and concrete pads could possibly have developed cracks, allowing waste to seep into the soil. The soil beneath the tanks is sandy and probably very permeable (see Appendix B, well log CP104-A). Groundwater is 3 to 7 ft below the surface. A spill of waste oil (40,000 gal) occurred from Tank 94 prior to paving of the surface (Mathews, N., 28 March 1988, personal communication). Barrels of oil contaminated soil from past spills in the Marine Diesel Oil yard are stored near Tank 93 (see Photo 15). There are no human groundwater receptors within 0.5 mi (Kautz, M., 7 April 1988, personal communication). Contaminated groundwater could potentially affect Elliott Bay.

Air is a potential pathway of concern in the immediate area because the tanks are vented directly to the air. Volatile compounds associated with petroleum wastes and oily wastewater can be released from the open tank vents during the thermal treatment process. The receptors at risk from the air pathway would include only Chempro employees.

Subsurface gas is not a pathway of concern because the wastes associated with this unit will not generate dangerous gases. Surface water is not a pathway of concern because all surface drainage is directed to blind sumps within the containment area.

5.1.2.4 Conclusions and Recommendations--

Because the groundwater is shallow, the intervening soil consists of sand and gravel (see Appendix B), and there are records of past spills, contaminant migration from this area is likely. The well log from downgradient well CP-103-B indicates soil contamination. Groundwater samples should be analyzed to determine the nature of contaminants. The source for the contamination is unknown. Borehole soil and groundwater samples should be collected and analyzed from wells immediately upgradient and downgradient from the vicinity of the spill to determine the nature and extent of

contamination caused by waste oil spills (see Section 5.5.4). The facility should implement a tank leak-testing program.

5.1.3 Unit 4. Oily Wastewater Storage/Treatment Tank 90

5.1.3.1. Description--

Tank 90 is located in the Black Oil Yard (see Figure 2). Details of the construction design and date is not known. The justification for separating this tank from the other oily wastewater storage/treatment tanks is by its physical location. The capacity of Tank 90 is approximately 14,691 bbls (617,022 gal). The top vent is kept open, and the tank does not have an automatic shut-off or alarm system. The Black Oil Yard is contained by a 15 ft concrete wall. The entire area within the wall is paved with concrete. The tank is inspected visually daily. There are no records of tank leak-tests for Tank 90.

5.1.3.2 Waste Characteristics--

The tank contains oily wastewater contaminated with heavy metals such as lead, hexavalent chromium, and zinc. Volatile organic compounds may also be associated with this waste. Analytical data for the wastes contained within this tank are not available.

5.1.3.3 Migration Pathways, Evidence of Release, and Exposure Potential--

Groundwater and soil are potential pathways of concern. The groundwater is shallow and the underlying soil is permeable (see Appendix B). The groundwater well logs for downgradient wells CP-103 A & B indicate the presence of an oily material in the soil and groundwater. Past leakage from this unit may have contaminated those wells. Tank 90 shows signs of having been overfilled. Oil stains are obvious from the top vents (see Photo 18). The groundwater receptor within 0.5 mi is Elliott Bay and the associated marine life.

Air is a potential pathway of concern because the open tank vent allows volatile organic compounds to be released to the atmosphere (see Section 5.1.2.3). There is no analytical data on the ambient air quality in the vicinity of this unit. The receptors at risk from the air pathway would include only Chempro employees.

Subsurface gas and surface water are not pathways of concern as described for Unit 3, Section 5.1.2.3.

5.1.3.4 Conclusions and Recommendations--

Since there is no direct evidence of past releases at this unit, no further action under the RFA/RFI process is recommended specifically for this unit. However, there is a potential for contamination beneath this and other units at the facility from documented and undocumented spills. The overall extent of this suspected contaminant plume should be characterized. The area around the tank was only recently paved (1986). Any spills prior to that time could have contaminated the soil and groundwater. The analytical results from the samples collected at CP-103 should be evaluated to determine if contaminants are present in the soil and groundwater which could have originated from upgradient units including Tank 90. These results were not available for review at the time of this report preparation. If these results show contamination, additional borehole soil and groundwater samples should be collected and analyzed from several locations to attempt to further characterize the contamination plume. See Section 5.5.4 for specific recommendations.

5.1.4 Unit 5. Sludge Dewatering/Storage

5.1.4.1 Description--

The sludge dewatering/storage tanks are located in the Small Yard (see Figure 2). These tanks are designated as Tanks 106, 108, 109, and 111. All four tanks are constructed of mild steel with a steel base on a concrete pad. The capacity of each tank is 1,171 bbl (49,182 gal). The exact date

of construction is unknown. Chempro has used the tanks since leasing the facility in 1971. Chempro has never performed leak-testing on those four tanks. The tank vents are kept open and do not have an automatic shut-off or overflow alarm system.

The tanks are fully contained within the Small Yard by a 5-ft retaining wall. The entire area is paved with concrete (since 1986, see Photos 23 and 24). Surface drainage is to the blind sumps within the containment area.

The tanks are currently being used to store dewatered sludge. The decanter/centrifuge has been out of operation for approximately 1 yr. The sludges have been collecting in these tanks for approximately 5 yr (Mathews, N., 28 March 1988, personal communication). All tanks are filled to near capacity.

5.1.4.2 Waste Characteristics--

The waste sludge contained in these tanks has potentially high concentrations of lead, chromium, and zinc (see Appendix C). The facility has recently collected samples of the sludge for analysis, but the results were unavailable for this report (Mathews, N., 28 March 1988, personal communication). Chempro is in the process of preparing a report with the results of these analyses to be submitted to U.S. EPA Region X.

5.1.4.3 Migration Pathways, Evidence of Release, and Exposure Potential--

As with the other tanks in the oily wastewater treatment system, soil and groundwater are major pathways of concern (see Section 5.1.2.2). The daily visual tank inspections would not detect leakage through the tank bottom and underlying concrete tank foundation. Elliott Bay is the groundwater receptor of concern within 0.5 mi.

Air is a potential pathway of concern because the open vents allow volatile organic compounds to be released to the atmosphere. However, the concentration of volatile organic compounds is expected to be extremely low

at this point in the treatment process. The potential for air release is extremely low. The primary receptors of concern within 0.5 mi are the Chempro employees. There is no analytical data on the ambient air quality in the vicinity of the Small Yard.

Subsurface gas and surface water are not pathways of concern as described for Unit 3, Section 5.1.2.3.

5.1.4.4 Conclusions and Recommendations--

Soil borings and groundwater samples should be collected and analyzed in conjunction with the recommended program as described in Section 5.5.4 to determine whether contamination has migrated into the underlying soil at the Small Yard. Evaluation of the analytical data from the most recent sludge sampling activity needs to be performed to fully characterize the nature of the stored wastes. This material may be classified as land disposal restricted waste, which would prohibit the facility from storing it for more than a 1 yr period. All tanks used for sludge dewatering should be leak-tested on a periodic schedule.

5.1.5 Unit 6. Sludge Decanter/Centrifuge

5.1.5.1 Description--

The decanter/centrifuge unit is currently inoperable. The unit has been out of order for approximately 1 yr (Mathews, N., 28 March 1988, personal communication). The facility manager indicated that the decanter has been repaired and will be put back into operation in the near future. The operating capacity of the unit is roughly 35 gal/min of sludge.

The unit is located in the northeast corner of the Small Yard (see Figure 2), immediately adjacent to the 5 ft containment wall (see Photo 12). The decanted sludge is generated within the confines of the Small Yard. The sludge is transferred to 55-gal drums on the outside of the contaminant area

via conveyor belt. Because the unit was not in operation, hazardous waste container loading procedures were not observed during the visual site inspection.

5.1.5.2 Waste Characteristics--

The waste sludge potentially contains high concentrations of heavy metals such as lead, chromium, and zinc (see Appendix C). The wastes are not routinely analyzed and no analytical data are presently available for evaluation. However, recent sampling in Unit 5 (sludge dewatering tanks) will provide analytical data needed to evaluate waste characteristics. Chempro is to submit this data to U.S. EPA Region X.

5.1.5.3 Migration Pathways, Evidence of Release, and Exposure Potential--

This unit is located on a concrete pad and contained within the berm of the Small Tank yard. Therefore, groundwater, soil, surface water, and subsurface gas are not presently pathways of concern. Air is a slight pathway of concern when the unit is operating. Any residual volatile organic compound present in the sludge may be able to escape into the air. Also particulate material produced during the decanting process may become airborne. The receptors of concern would be the facility personnel (approximately 10 people).

5.1.5.4 Conclusions and Recommendations--

No further action under RFA/RFI process (see Section 5.1.3.4). The waste handling practices at this unit do not pose environmental release hazards. The facility may want to implement an air monitoring program during operating periods of this unit.

5.1.6 Unit 7. Final Water Storage Tank

The Final Water Storage Tank (Tank 112) is located in the northeast corner of the Small Yard (see Figure 2). This tank is composed of mild steel

constructed on a concrete foundation and has a capacity of 1,171 bbl (49,182 gal). Tank 112 is used as a final storage tank for treated wastewater prior to discharge into the Metro sewer system. The tank is inspected visually every day for signs of leakage.

The justification for classifying this tank as a SWMU is because at times, the treated wastewater does not meet Metro discharge standards (e.g., pH below 5.5, heavy metals content, or oil and grease over 100 ppm). Therefore, this tank can, and has been, used to store waste and should be treated as a waste management unit.

5.1.6.2 Waste Characteristics--

Tank 112 contains treated wastewater. The Metro permit standards require the pH to range between 5.5 and 10.5, oil and grease content to be below 100 ppm, and the heavy metal content as listed in Section 5.1. Chempro has a history of violations with respect to their discharge permit (Municipality of Metropolitan Seattle 1982). Therefore, the wastewater contained in Tank 112 has exceeded the above criteria.

5.1.6.3 Migration Pathways, Evidence of Release, and Exposure Potential

Groundwater and soil are potential pathways of concern. The groundwater is shallow and the underlying soil is relatively permeable (see Appendix B). As with all other Chempro tanks, Tank 112 has not been leak-tested within the past 17 yr. There is no evidence of spills or leaks from Tank 112. Groundwater receptor within 0.5 mi is the Elliott Bay habitat.

Air is not a potential pathway of concern because any volatile organic compounds present would be released during the treatment processes. The concentrations of volatile compounds at this point in the Chempro process is expected to be extremely low or nonexistent.

Subsurface gas is not a pathway of concern because of the nature of the wastes. Surface water is not a pathway of concern because this unit is

contained within the small tank yard. All surface drainage is directed to the blind sump system.

5.1.6.4 Conclusions and Recommendations--

As with other Chempro tanks, cracks or fatigue in the tank bottom and concrete foundations may be present. If the tanks are leaking through the foundations, contaminants could be migrating into the soil. Soil boring and groundwater samples should be collected in conjunction with the recommendations as in Section 5.5.4. Chempro should leak-test this tank.

5.1.7 Unit 8. Storm Water Sump System

5.1.7.1 Description--

The facility storm water drainage is a closed system. No surface drainage flows directly off-site. The system consists of several storm drains located throughout the facility. The main collection point of the drainage system is a sump located in the northwest quadrant of the facility (see Figure 2).

The sump is constructed of 8 in clay bricks (see Photos 5 and 6). At the time of the visual site inspection (VSI), the sump was full of oily water. This water was being pumped into the oil/water separator. The facility does not inspect the sump for leaks. The pavement immediately surrounding the sump is damaged (see Photo 5).

This storm water sump system does not collect water from the contained tank yards. The facility manager indicated that storm water from offsite drains into Chempro's system. Chempro's agreement with Metro is to treat all surface water that drains into the Chempro system (Mathews, N., 28 March 1988, personal communication).

5.1.8 Unit 9. Pipe Alley Drainage

5.1.8.1 Description--

The pipe alley is a shallow trough approximately 3 ft deep, 25 ft wide, and 100 ft long. The pipe alley is located between the Marine Diesel Oil Yard and Small Yard. The alley is constructed of concrete and is isolated from the tank storage areas by concrete containment walls (see Photo 11).

Storm water collects in the pipe alley. At the time of the visual site inspection, the alley was filled with dark, oily water and the alley foundation was obstructed from view. Chempro pumps this water into their oil/water separator for treatment.

5.1.8.2 Waste Characteristics--

The oily water in the pipe alley has not been analyzed. The oil contamination source is unknown. The oil may be leaks from the Pacific Northern Oil Company's product lines as well as leaks from the Chempro system.

5.1.8.3 Migration Pathways, Evidence of Release, and Exposure Potential--

Groundwater and soil are pathways of concern. The groundwater is shallow and the intervening soils are permeable (see Appendix B). The water in the pipe alley is obviously contaminated with an oily substance. Because the contamination source is unknown, the environmentally conservative assumption is that the substance is waste oil from the Chempro operation. The observation of product in the soil at the downgradient well location CP-103-A and B suggests possible contaminant migration from this source. Elliott Bay is the primary receptor of concern within 0.5 mi of the site.

Air is a potential pathway of concern. Volatile organic compounds associated with petroleum products may be present, especially if new product is leaking from PANOCO fuel tank pipes. However, the pipe alley should only

5.1.7.2 Waste Characteristics--

The sump could potentially contain any material spilled on-site. At the time of the VSI, the sump contained oily wastewater, similar to that observed in the oil/water separator. There is no analytical data on the nature of waste in the storm drain.

5.1.7.3 Migration Pathways, Evidence of Release, and Exposure Potential--

Groundwater and soil are major pathways of concern. The brick construction of the sump would most likely promote contaminant migration into the soil and groundwater. The bottom of the sump is below the local groundwater level. The groundwater receptor within 0.5 mi of the site is Elliott Bay.

Air is a minor pathway of concern. Volatile compounds associated with spill petroleum products could be present in the sump. However, it is not anticipated that the concentration of volatiles in this material would be significant.

Subsurface gas is not a pathway of concern because of the nature of the wastes. Surface water is not a pathway of concern because the entire unit is below surface level.

5.1.7.4 Conclusions and Recommendations--

The sump provides a very high potential for groundwater and soil contamination. The sump should be inspected for evidence of release. A possible method to check this would be to drain the unit completely dry and observe any infiltration of groundwater into the sump. If groundwater can enter the sump, contaminated storm water can also enter the aquifer. The entire storm water drain system should be inspected for potential leaks. If it is determined that the sump is leaking, the walls should be sealed to prevent contaminated storm water from migrating into the aquifer.

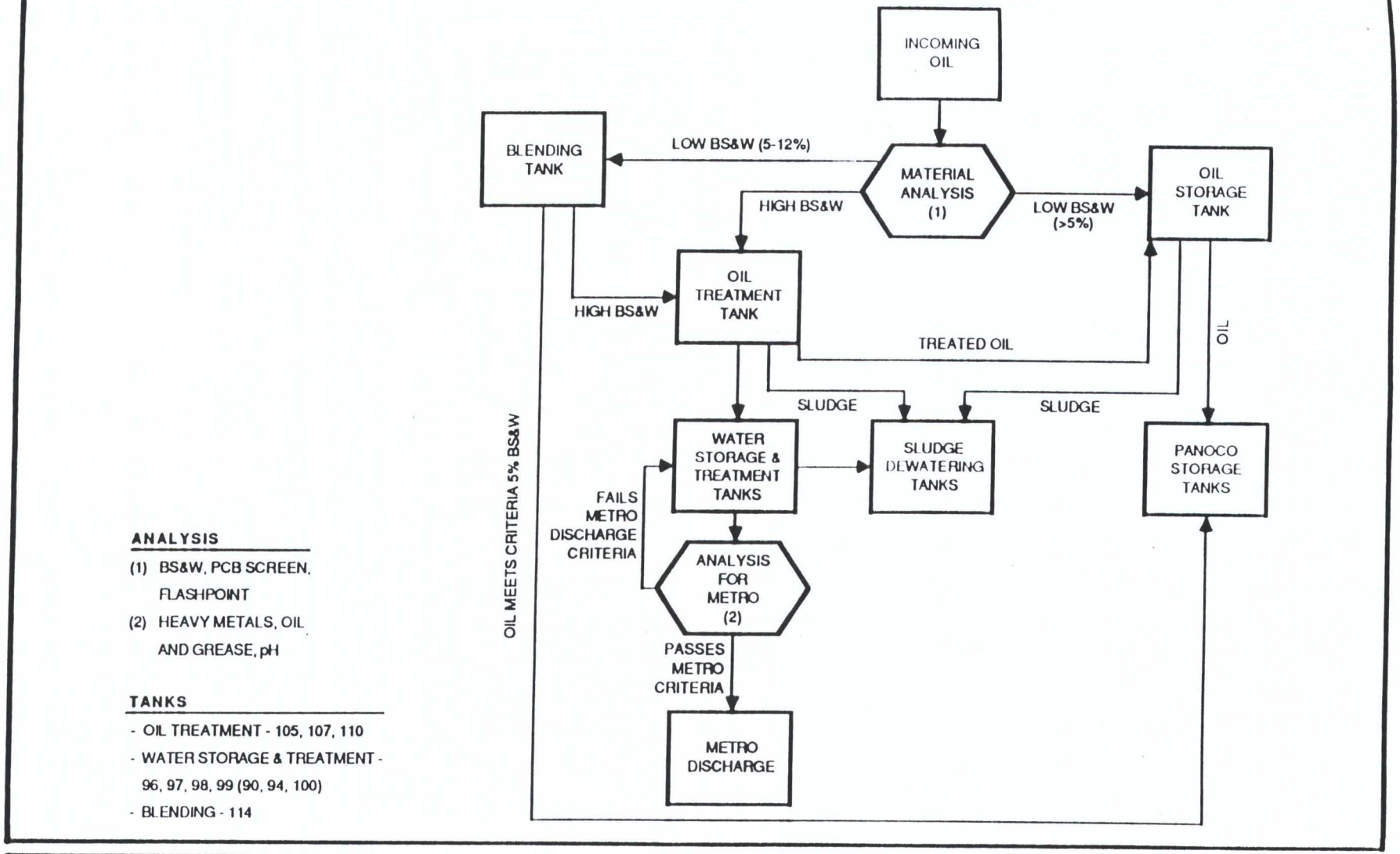


Figure 5. Flow diagram of the Chempro Pier 91 waste oil treatment process.

be considered as a occupational hazard and not a source for extensive environmental contamination. There is no air monitoring data for the pipe alley area. The receptors of concern would be Chempro employees.

Surface water is not a pathway of concern because the pipe alley is totally bermed. Subsurface gas is not a pathway of concern because of the nature of the wastes.

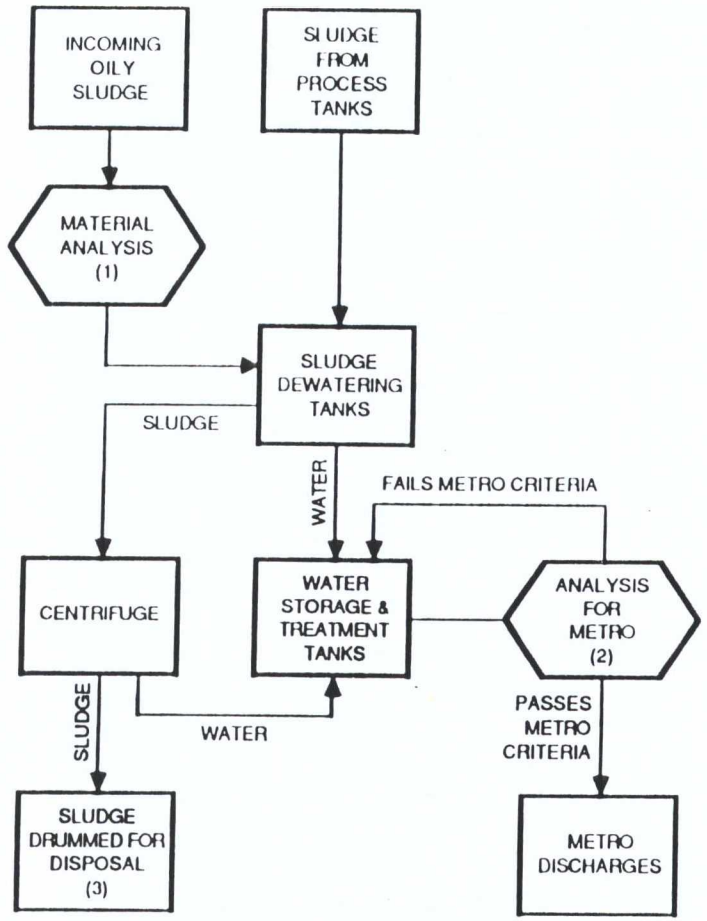
5.1.8.4 Conclusions and Recommendations--

The pipe alley may provide a potential pathway for groundwater and soil contamination. The alley should be inspected for leaks, and all cracks sealed. If major cracks are discovered, soil borings and groundwater samples should be collected and analyzed in conjunction with the program described in Section 5.5.4 to determine the nature and extent of contamination. At a minimum, samples of the oily wastewater in the alley should be collected to determine the nature of the contaminants and possibly identify the source.

5.2 WASTE OIL TREATMENT

Chempro treats waste oil for resale. The waste oil treated at Chempro is delivered by bulk tank trucks. These trucks are owned and operated by independent transporters. The Chempro Pier 91 facility does not generally accept drums of waste oil. However, if a customer makes arrangements with the facility, waste oil in 55-gal drums can be accepted. Waste oil collected by the facility's oily wastewater treatment process is also treated for resale.

All incoming oil is analyzed for total chloride including PCB, flashpoint and bottom sediment and water (BS&W; see Figure 5). If the total chlorine content is over 1,000 ppm, and/or the flashpoint is less than 140^{o}F, the waste oil is rejected. Waste oil that passes the total chloride screen and flashpoint test is analyzed for total BS&W. If the BS&W is less than 12 percent, the waste oil can be pumped directly into the oil blending



ANALYSIS

(1) BS&W

(2) HEAVY METALS, OIL AND GREASE, pH

(3) HAZARDOUS WASTE CHARACTERIZATION

TANKS

- SLUDGE DEWATERING - 106, 108, 109, 111
- WATER STORAGE & TREATMENT - 96, 97, 98, 99 (90, 94, 100)

Figure 6. Flow diagram of the Chempro Pier 91 oily sludge treatment process.

tank (Tank 114, see Figure 2). Waste oil with over 12 percent BS&W is pumped to the oil treatment tanks. Incoming waste oil with less than 5 percent BS&W, is pumped directly to Tank 102. This tank is owned and operated by PANOCO.

The waste oil with high BS&W is heated to 190°F and treated with sodium silicate to separate the sediment and water. Emulsified oil is also treated in these tanks by heating to it 190°F and treating it with calcium chloride.

After treatment, the recovered oil is transferred to Tank 114 for blending and resale (see Figure 5). The wastewater is analyzed for the Metro permit standards and either discharged to the sewer system or treated until the criteria are met. The sludge is transferred to the dewatering/storage tanks and prepared for subsequent centrifugation and shipment off-site (see Figure 6). The decanter/centrifuge unit is currently non-functional. Therefore, all sludges are being stored in Tanks 106, 108, 109, and 111.

The two solid waste management units associated with the waste oil treatment processes are:

- Waste oil treatment tanks
- Oil blending tank.

The detailed descriptions for each of these two SWMUs are presented below.

5.2.1 Unit 10. Waste Oil Treatment Tanks

5.2.1.1 Description--

The waste oil treatment tanks are located in the Small Yard (see Figure 2). The tanks included in this system are designated as Tanks 105, 107, and 110. Each tank has a maximum capacity of 1,171 bbl (49,182 gal). The tanks are constructed of mild steel placed on a concrete foundation. The area surrounding the tanks is completely covered with concrete and is

Subsurface gas is not a pathway of concern because of the nature of the wastes. Surface water is not a pathway of concern because the drainage in the tank yard feeds to the blind sump.

5.2.1.4 Conclusions and Recommendations--

These tanks need to be leak-tested to determine whether release through the tank bottoms and concrete foundation is occurring. Soil borings and groundwater samples should be collected and analyzed in conjunction with the program described in Section 5.5.4 in the Small Yard to determine the extent, if any, of soil contamination.

5.2.2 Unit 11. Oil Blending Tank

5.2.2.1 Description--

The oil blending tank (Tank 114) is located in the northeast corner of the Small Yard (see Figure 2). This tank is constructed of mild steel placed on a concrete foundation. The maximum capacity is 1,240 bbl (52,069 gal). The tank is inspected daily for visual signs of leakage or overflow. The tank has not been leak-tested for the past 17 yr. The tank does not have an automatic shut-off control or overflow alarms.

The oil blend tank can receive waste oil directly from the oil truck off-loading area if the oil has less than 12 percent bottom sediment and water content (see Figure 5). Therefore, this tank can receive and distribute untreated waste oil.

5.2.2.2 Waste Characteristics--

The oil blending tank can contain untreated waste oil. The sediment in this waste can potentially contain heavy metals such as lead, chromium, and zinc. Metal analyses are not performed on the incoming oily wastes. Volatile organic compounds may be present in the waste oil.

contained by a 5 ft masonry wall (see Photos 8, 9, and 10). The exact date of tank construction is unknown. Chempro conducts daily visual inspections on each of these tanks. However, the tanks have not been leak-tested since Chempro leased the facility in 1971. All tanks vent directly to the atmosphere and are normally kept open. None of the tanks have automatic shut-off controls or overflow alarms.

5.2.1.2 Waste Characteristics--

Tanks 105, 107, and 110 contain waste oil with bottom sediment and water contents in excess of 12 percent. The waste oil potentially contains heavy metals such as lead, chromium, and zinc (see Appendix C). The waste oil is not analyzed for organic composition. The waste oil potentially contains volatile organic compounds associated with petroleum products.

5.2.1.3 Migration Pathways, Evidence of Release, and Exposure Potential--

Groundwater and soil are potential pathways of concern. The groundwater is shallow and the underlying soil is permeable (see Appendix B). Downgradient wells (CP-103, see Figure 3) show signs of soil contamination. If the tank bottoms and concrete foundation have any leaks, the daily visual inspections may not reveal release of waste. The area surrounding these tanks do not show any signs of spillage or overflow. The primary receptor within 0.5 mi is Elliott Bay.

Air is a potential pathway of concern because the tanks vent directly to the air (see Section 5.1.2.3). The treatment process involves heating the waste oil to 190^{o} F. This process may cause the release of petroleum associated volatile organic compounds (e.g., benzene). However, the concentration of volatile compounds is expected to be very low, and the wind will disperse emissions from the tank vents. There is no analytical data on the air quality of vapors venting from the tanks. The receptors at risk are primarily Chempro employees.

and treated in the same units (Tanks 115, 116, 117, and 165). This section will include a discussion of all treatment processes relevant to these units.

Incoming phenol contaminated wastes and coolants are isolated from the oil wastewater and oil treatment units (see Figure 4). The coolant or phenolic waste is pumped into storage Tanks 115, 116, or 117. This waste is treated in Tank 165. The Rec Tank was formerly used for coolant treatment. This tank has been decommissioned, dismantled, and removed from the Pier 91 facility.

The phenol contaminated oil and wastewater treatment process involves chemical oxidation by using sulfuric acid, ferrous sulfate, and hydrogen peroxide or potassium permanganate. A chemical reduction process follows the oxidation. The pH of the waste is increased to 10.5 by the addition of sodium hydroxide. Sodium metabisulfite is added to reduce the hexavalent chromium to trivalent chromium. Phenolic and non-phenolic coolants are treated with a sulfonate modifier, flocculants, caustics, and calcium chloride.

Residual sludges from the oxidation and reduction processes of phenolic oil and wastewater are transferred to Tanks 106, 108, 109, and 111 for dewatering and subsequent centrifugation. The wastewater is analyzed ~~for~~ Metro permit standards prior to discharge. The residue ~~from~~ the coolant treatment is transferred to Tank 118 for storage ~~and~~ subsequent shipment to the Lucille Street Chempro facility. This residue is used as an alternative fuel material.

what is this Oil?

Four solid waste management units have been identified in the waste coolant treatment system. These units are:

- Waste coolant storage area
- Waste coolant treatment tanks

5.2.2.3 Migration Pathways, Evidence of Release, and Exposure Potential--

As with all tanks at the Chempro Pier 91 facility, the groundwater and soil are potential pathways of concern. Contamination has been detected in the soil at Wells CP-103, 104, 106 (see Figure 3). The source of this contamination has not been identified. Elliott Bay is the primary receptor of concern within 0.5 mi.

Air is a potential pathway of concern (see Section 5.2.1.3). The tank is vented directly to the atmosphere. Volatile organics associated with petroleum products may be released to the air. There is no analytical data for the air quality in the blending tank vicinity. The receptors within 0.5 mi include Chempro employees.

Subsurface gas is not a potential pathway because of the nature of the material involved. Surface water is not a pathway of concern because the tank is contained within the Small Yard bermed area.

5.2.2.4 Conclusions and Recommendations--

This tank presents a moderate potential for release to the soil and groundwater. The tank shows no outwardly visible evidence of leakage or spillage. However, until the source of groundwater contamination has been identified, this Chempro tank should be considered a potential source (see Section 5.1.3.4). The tank should be leak-tested.

5.3 WASTE COOLANT TREATMENT

Chempro treats phenol contaminated oil, wastewater, and coolants. The phenol contamination is typically the result of additives used to control biological activity. The Chempro process can treat wastes with maximum phenol concentrations of 2,000 to 3,000 ppm. Not all waste coolants accepted by Chempro are contaminated with phenol. However, both phenol contaminated oil, wastewater, coolant, and non-phenolic coolant are stored

The tanks were probably constructed at the same time as the other Chempro tanks. The tank bottoms and concrete foundations may leak, and the visual inspections conducted by Chempro may not reveal such leaks. There is no analytical evidence that indicates contamination from these tanks. Groundwater receptor within 0.5 mi of the facility in Elliott Bay.

Air is a potential pathway of concern. The tanks are vented to the atmosphere. Phenol vapors and volatile organic compounds can escape from the tank. The air pathway should only be considered a potential occupational hazard and not a source for extensive environmental contamination because of the low volatile organic compound concentration and potential for wind dispersion of any emissions. The receptors within 0.5 mi include the Chempro employees.

Subsurface gas is not a pathway of concern because of the nature of the compounds stored in the tanks. Surface water is not a pathway of concern because of the nature of the compounds stored in the tanks. Surface water is not a pathway of concern because the tanks are contained within the bermed, small tank yard.

5.3.1.4 Conclusions and Recommendations--

These tanks present a potential source of contamination the groundwater. These tanks need to be leak-tested. Soil borings and groundwater samples should be collected and analyzed in conjunction with the program described in Section 5.5.4 to determine whether phenolic contaminants have entered the soil from this location.

5.3.2 Unit 13. Waste Coolant Treatment Tank

5.3.2.1 Description--

Tank 165 is used for the treatment of coolant and phenolic wastewater. This tank is located in the Small Yard between Tanks 106 and 108. The tank is constructed of mild steel with a concrete foundation. The details of

- Rec tank (former coolant treatment tank)

- Waste coolant slop/residue tank.

Detailed descriptions for each of these four SWMUs are presented below. Analytical data were not available at the time this report was prepared. The information is forthcoming and will be integrated into the final report.

5.3.1 Unit 12. Wastewater Coolant Storage Area

5.3.1.1 Description--

The waste coolant is stored prior to treatment in Tanks 115, 116, and 117 located on the eastern portion of the Small Yard (see Figure 2). The tanks are constructed of mild steel on a concrete foundation. The exact date of construction is unknown. The tanks are taller and have a smaller diameter than the other tanks in the Small Yard (see Photo 23). The area surrounding the tanks is completely paved with concrete. The coolant storage tanks are contained by the berm surrounding the Small Yard. The tanks vent directly to the atmosphere through open top vents. The tanks do not have any automatic shut-off controls or overflow alarms. These tanks are inspected daily for visual signs of leaks or spills.

5.3.1.2 Waste Characteristics--

These tanks contain both phenol contaminated wastewater and coolant as well as non-phenolic coolant. The maximum phenol concentration of wastes treated by Chempro is 2,200 ppm. This waste may also contain heavy metals and volatile organic compounds.

5.3.1.3 Migration Pathway, Evidence of Release, and Exposure Potential--

Groundwater and soil are potential pathways of concern. The groundwater is shallow and the soil underlying the area is permeable (see Appendix B).

Figure 2). The former treatment tank was a rectangular tank with dimensions 30 ft x 8 ft x 3.5 ft. The tank was equipped with steam lines for thermal treatment. The tank had a steel bottom and was set directly on the concrete pavement. The tank was not in a bermed area. The surface drainage was to the storm water sump system (see Photo 33). The tank was reportedly cleaned, dismantled, and shipped to Chempro Lucille Street for further decontamination.

5.3.3.2 Waste Characteristics--

The waste characteristics are identical to Unit 13 (waste coolant treatment Tank 165).

5.3.3.3 Migration Pathways, Evidence of Release, and Exposure Potential--

This unit was operated in an unbermed area. The pavement is cracked and pitted (see Photo 33). Therefore, groundwater and soil are potential pathways of concern from past spills. There are no reported spills from this unit. Air, surface water, and subsurface gas are not pathways of concern because this unit is no longer in existence at the Chempro facility. Elliott Bay is the primary groundwater receptor within 0.5 mi of the facility.

5.3.3.4 Conclusion and Recommendations--

The former coolant treatment (rec) tank could have released contaminants to the storm sewer system (Unit 8). The fatigued condition of the adjacent pavement could have potentially allowed contaminants to enter the soil, and subsequently the groundwater. Groundwater and soil samples should be collected and analyzed in conjunction with the program in the MDO Yard (see Section 5.5.4) to determine whether phenolic compounds have entered the aquifer (see Section 5.1.3.4). Monitoring well CP-106 is potentially downgradient and may be adequate to monitor release from this unit. However, further hydrogeologic data is needed to fully evaluate the groundwater flow direction (see Section 2.4).

construction are unknown. The maximum capacity is 282 bbl (11,844 gal). The area surrounding Tank 165 is paved with concrete. The contents of the tank are contained within the Small Yard by a 5 ft masonry wall (see Photo 32). The tank contains steam lines for thermal treatment and is vented directly to the atmosphere. The tank does not have an automatic shut-off control or overflow alarm. The tank is inspected daily for leaks and spills.

5.3.2.2 Waste Characteristics--

This tank contains both phenol contaminated wastewater and coolant as well as non-phenolic coolant. The maximum phenol concentration of waste treated by Chempro is 2,200 ppm. The wastes may also contain volatile organic compounds and heavy metals.

5.3.2.3 Migration Pathways, Evidence of Release, and Exposure Potential--

The migration pathways, evidence of release, and exposure potentials for this unit are the same as for Unit 12 (waste coolant treatment area, see Section 5.3.1.3).

5.3.2.4 Conclusions and Recommendations--

Because groundwater and soil are potential pathways of concern, soil borings and groundwater samples should be collected and analyzed in conjunction with the program described in Section 5.5.4 in the Small Yard to determine whether contaminants have been released into the soil or groundwater. All tanks in the waste coolant treatment and storage system should be leak-tested.

5.3.3 Unit 14. Rec Tank (Former Coolant Tank)

5.3.3.1 Description--

The rec tank has been removed from the Chempro Pier 91 facility. The tank was located immediately north of the Small Yard containment wall (see

5.3.4 Unit 15. Waste Coolant Slop/Residue Tank

5.3.4.1 Description--

Tank 118 is used to store the residue (slop) from the phenolic wastewater and coolant treatment. This tank is located in the eastern end of the Small Yard near the coolant storage tanks (see Figure 2). The tank is constructed of mild steel placed on a concrete foundation. The date of construction is unknown. The maximum capacity is approximately 429 bbl (18,000 gal). Tank 118 is located within the Small Yard containment wall (see photo 23). The tank is inspected daily for leaks and spills (Lund, K., 30 March 1988, personal communication). There are no automatic shut-off or overflow alarms on Tank 118.

5.3.4.2 Waste Characteristics--

The coolant treatment residues potentially contain phenols and heavy metals. Chempro does not analyze this waste stream. The residue is manifested as a hazardous waste liquid when transported to the Lucille Street Chempro facility.

5.3.4.3 Migration Pathways, Evidence of Release, and Exposure Potential--

As with the other units at the Chempro facility, groundwater is a potential pathway of concern. The groundwater is shallow and the underlying soil is permeable (see Appendix B). The tank has not been leak-tested for at least 17 yr. The daily inspection will not detect contaminants migrating through the concrete foundation. Elliott Bay is the groundwater receptor of concern within 0.5 mi of the facility.

Air is not a potential pathway of concern because the volatile constituents probably have been evolved during the thermal treatment process (see Section 5.3.2.3).

Surface water is not a pathway of concern because the residue tank is contained within the Small Tank Yard. All surface water is this area drains to blind sumps. Subsurface gas is not a pathway of concern because of the nature of the waste.

5.3.4.4 Conclusions and Recommendations--

This unit poses a moderate potential for groundwater contamination. The entire surrounding area is paved with concrete. Leak-testing should be performed on this tank along with all other tanks at the Chempro facility. Groundwater sampling and monitoring at Well CP-106 (see Figure 3) and soil borings in the Small Yard should be performed in conjunction with the program described in Section 5.5.4 to determine whether phenolic contaminants from Tank 118 are entering the aquifer. The absence of contaminants in well CP-106 should not be used as evidence for contaminant from this unit. Groundwater measurements are inconclusive to determine the exact flow direction of the aquifer (see Section 2.4).

5.4 UNIT 16. SAMPLE STORAGE AREA

5.4.1 Description

The sample storage area is located in the main warehouse (see Figure 2). This area is used to store incoming sample aliquots (duplicates). The sample room has an unbermed, concrete floor. There are no floor drains in the room. Samples are placed in cardboard boxes (photos 30 and 31). These boxes are in poor condition and are stacked on one another. The storage room has inadequate shelf space. Most of the boxes of samples are on the floor. Various sample container types are used (e.g., nalgene, glass, and stainless steel). The sample storage room is not locked or restricted from general facility personnel. Samples have been stored in this area for over 1 yr. The daily facility inspection does not include this area (Mathews, N., 28 March 1988, personal communication).

not required unless wastes.

5.4.2 Waste Characteristics

The sample bottles contain all types of incoming waste streams sampled at Chempro. This includes samples from rejected shipments. The waste types include waste oil, coolant, phenolic wastewater, and chlorine contaminated wastes.

5.4.3 Migration Pathways, Evidence of Release, and Exposure Potential

Several of the sample containers appear to be leaking (see photo 31). The cardboard boxes have oil stains and the floor also has stains. The duplicate samples are not kept in an orderly fashion. Filled sample bottles were observed in a garbage can with general refuse (see photo 36). Releases from the sample storage area cannot migrate to the groundwater. Therefore, groundwater is not a pathway of concern. Air, surface water, and subsurface gas are also not pathways of concern because of the small sample quantity, contained surface drainage, and nature of waste. Because the sample duplicates are not kept in a secure area, the facility personnel can come into contact with spilled sample material.

5.4.4 Conclusions and Recommendations

The sample storage area presents a minor source for environmental contamination. However, the storage techniques and practices may lead to the spillage of small quantities of potentially hazardous waste. The facility should implement a sample duplicate storage procedure which reduces the risk of spills and ensures that potentially incompatible wastes are stored properly.

5.5 UNIT 17. WASTE OIL SPILLS

5.5.1 Description

Accidental spills have occurred repeatedly in the Marine Diesel Oil Yard (see Figure 2). Approximately 520,562 gal of oil, waste oil, and oily

wastewater has been reportedly spilled in this general vicinity (Lund, K., 30 March 1988, personal communication). The Marine Diesel Oil Yard is contained by a 15 ft masonry wall. However, prior to 1986, the surface of the tank yard was native soil. Approximately 485,000 gal was spilled on the unpaved surface. In 1986 some of the oil contaminated soil was excavated and placed in 55-gal drums. The surface of the tank yard was paved with concrete. The drums of oil contaminated soil remain next to Tank 93 (see photo 15). Other contaminated soil was sealed in boxes constructed between the buttresses on the containment wall. Waste oil is currently seeping from these boxes (see photo 14).

Chempro has recently performed a soil sampling study (December 1987). Two samples were collected hydraulically downgradient from the Marine Diesel Oil Yard. These locations are designated as HA-1 and HA-2 (see Figure 3). This study was performed in conjunction with the groundwater sampling. The analytical results are forthcoming.

5.5.2 Waste Characteristics

The wastes released during these spill events have the same characteristics of the other materials that Chempro handles as discussed in previous sections. The waste potentially contains heavy metals such as lead, chromium, and zinc as well as volatile organic compounds.

5.5.3 Migration Pathways, Evidence of Release, and Exposure Potential

Groundwater is the major pathway of concern. The soil is relatively permeable (sand and gravel) and the water table aquifer is approximately 3 to 7 ft below the land surface (see Appendix B). An oily material (product) has been observed in the soil at Monitoring Well CP-103 which is downgradient of the spills. The source of this material is unknown, but may be the result of past spills in the Marine Diesel Oil Yard. Groundwater receptor of concern within 0.5 mi of the facility is Elliott Bay.

Because the nature of the spilled material is relatively non-volatile, and the spill area has been cleaned, air is not a pathway of concern. Surface water is not presently a pathway of concern because the spill area is completely contained within the berms. Subsurface gas is not a pathway of concern because of the nature of the spilled material.

5.5.4 Conclusions and Recommendations

The spills which occurred prior to the paving of the Marine Diesel Oil Yard pose the most serious threat to soil and aquifer contamination at the Chempro facility. The facility should conduct soil boring and analysis program to determine the vertical extent and nature of soil contamination.

Continued groundwater monitoring at the newly installed downgradient groundwater wells (CP-103 A & B) is recommended to detect contaminant migration and to confirm groundwater flow direction, tidal and seasonal water level variation.

In addition, a soil boring and groundwater sampling program should be implemented to include the areas within the Marine Diesel Oil Yard, the Black Oil Yard, and the Small Yard. These should include samples from both the vadose (unsaturated) and saturated zones. Because the suspected tidal influence may strongly affect local hydraulic gradients and subsequent contaminant migration directions, it may be difficult to determine the exact source of soil and groundwater contamination. Therefore, the soil boring program should be designed and implemented to determine the lateral extent of contaminant source. The recommended tank leak-testing will be better suited to identify potential contamination point sources. Groundwater samples should be collected and analyzed to determine the nature of groundwater contaminants.

This drilling and sampling program will also help characterize the contamination problem that may exist underneath the entire site as a result of undocumented releases from other units. As mentioned previously (in

connection with other units), the majority of units at the site potentially could have released contaminants to the soil and groundwater before the site was paved. Some may be releasing contaminants presently via leaking tanks and cracked concrete tank foundations.

6.0 REFERENCES

Austin, F. 25 April 1988. Personal Communication (conversation with Mr. David Kleesattel, Tetra Tech, Inc.). Puget Sound Air Pollution Control Agency, Seattle, WA.

Chemical Processors, Inc. 1986. Waste analysis plan for Chempro Pier 91. Chemical Processors, Inc., Seattle, WA. 22 pp.

Chemical Processors, Inc. 1987a. Closure plan Pier 91, Port of Seattle. Chemical Processors, Inc., Seattle, WA. 20 pp.

Chemical Processors, Inc. 1987b. Contingency Plan Pier 91 Facility. Chemical Processors, Inc., Seattle, WA. 25 pp.

Chemical Processors, Inc. 1987c. Treatment, storage, and disposal (TSD) and generator annual report for the Chempro Pier 91 Facility. Chemical Processors, Inc., Seattle, WA. 38 pp.

Kautz, M. 7 April 1988. Personal Communication (conversation with Mr. Brian O'Neal, Tetra Tech, Inc.) Washington Department of Ecology, Southwest Region, Redmond, WA.

Lund, Keith. 30 March 1988. Personal Communication (letter to Mr. David Kleesattel, Tetra Tech, Inc.). Chemical Processors, Inc., Seattle, WA.

Mathews, Nate. 28 March 1988. Personal Communication (conversation with Mr. David Kleesattel). Chemical Processors, Inc., Seattle, WA.

Metcalf and Eddy, Inc. 1985. Hazardous waste treatment, storage, and disposal facility site evaluation for Chemical Processors, Inc., Seattle, WA. Metcalf and Eddy, Inc., Woburn, MA. 15 pp.

Municipality of Metropolitan Seattle (Metro). 1982. Enforcement fact sheet (memorandum from Mr. Doug Hilderbrand). Metro, Seattle, WA.

Resslar, P.K. 25 September 1987. Interdepartmental Communication (letter to Mr. Dennis Stefani). Chemical Processors, Inc., Seattle, WA.

Tracy, Harry. 22 January 1979. Personal Communication (letter to Mr. Bob McCormick). Washington Department of Ecology. Olympia, WA.

U.S. Environmental Protection Agency, Region X. 17 March 1985. Potential hazardous waste site preliminary assessment, summary memorandum. U.S. EPA, Seattle, WA.

U.S. Geological Survey. 1983. 1:25,000 scale metric topographic map of Seattle north Washington. U.S. Geological Survey, Denver, CO.

Washington Department of Ecology. 1987. Resource, Conservation Recovery Act (RCRA) compliance evaluation inspection report. Department of Ecology, Redmond, WA. 4 pp.

Wells, Robert. 31 March 1988. Personal Communication (conversation with Mr. David Kleesattel, Tetra Tech, Inc.). Port of Seattle Department of Engineering, Seattle, WA.

ATTACHMENT A. PHOTOGRAPHIC LOG

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 1
Time 1300-1500

Description Waste oil truck off-loading area

Photographer Facing North
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 2
Time 1300-1500

Description Oil/water separator area

Photographer Facing Southwest
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 3
Time 1300-1500

Description Oily wastewater truck off-loading area

Photographer Facing South
Photographer Name O'Neal

APPENDIX A

VISUAL SITE INSPECTION PHOTOGRAPHIC LOG
28 MARCH 1988

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 7
Time 1300-1500

Description Operator testing laboratory

Photographer Facing East
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 8
Time 1300-1500

Description Small tank yard

Photographer Facing West
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 9
Time 1300-1500

Description Small tank yard

Photographer Facing West
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 4
Time 1300-1500

Description Oil/Water Separator

Photographer Facing West
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 5
Time 1300-1500

Description Storm water sump

Photographer Facing South
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 6
Time 1300-1500

Description Storm water sump
Brick-lined sump

Photographer Facing South
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 13
Time 1300-1500

Description Groundwater well near Tank 13

Photographer Facing Southwest
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 14
Time 1300-1500

Description Marine diesel oil yard

Photographer Facing West
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 15
Time 1300-1500

Description Marine diesel oil yard

Photographer Facing North
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 10
Time 1300-1500

Description Small tank yard

Photographer Facing Northwest
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 11
Time 1300-1500

Description Pipe alley

Photographer Facing West
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 12
Time 1300-1500

Description Sludge decanter/centrifuge

Photographer Facing West
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 19
Time 1300-1500

Description Oily wastewater Tank 90

Photographer Facing South
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 20
Time 1300-1500

Description Marine diesel oil yard

Photographer Facing Southwest
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 21
Time 1300-1500

Description Marine diesel oil yard

Photographer Facing West
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 16
Time 1300-1500

Description Wastewater sump in black oil yard
oil on ground from PANOCO tank

Photographer Facing West
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 17
Time 1300-1500

Description Wastewater sump in black oil yard
oil leaking from PANACO tanks

Photographer Facing Northwest
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 18
Time 1300-1500

Description Oily wastewater Tank 90
evidence of oil overflow

Photographer Facing South
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 25
Time 1300-1500

Description PANOCO sump area

Photographer Facing West
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 26
Time 1300-1500

Description Hazardous waste container storage area

Photographer Facing West
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 27
Time 1300-1500

Description Leaking hazardous waste drum

Photographer Facing West
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 22
Time 1300-1500

Description Marine diesel oil yard

Photographer Facing West
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 23
Time 1300-1500

Description Waste coolant storage treatment

Photographer Facing East
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 24
Time 1300-1500

Description Small yard storage/treatment tanks

Photographer Facing East
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 31
Time 1300-1500

Description Sample storage area

Photographer Facing Southeast
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 32
Time 1300-1500

Description Coolant treatment tank 165

Photographer Facing Southwest
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 33
Time 1300-1500

Description Former Rec Tank area

Photographer Facing East
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 28
Time 1300-1500

Description Hazardous waste storage drum
damaged drum

Photographer Facing Northwest
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 29
Time 1300-1500

Description Label on hazardous waste drum
No start date

Photographer Facing West
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 30
Time 1300-1500

Description Sample storage area
spill sample container

Photographer Facing Southeast
Photographer Name O'Neal

CHEMPRO PIER 91
VSI PHOTOGRAPHIC LOG
28 MARCH 1988

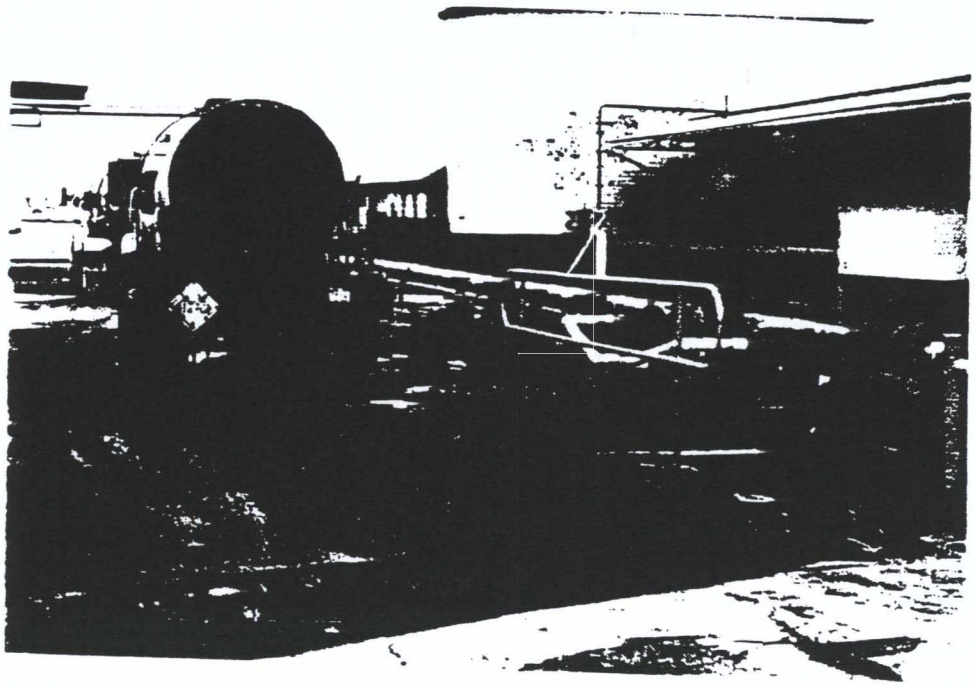


Photo 1. Waste oil tank truck off-loading area.

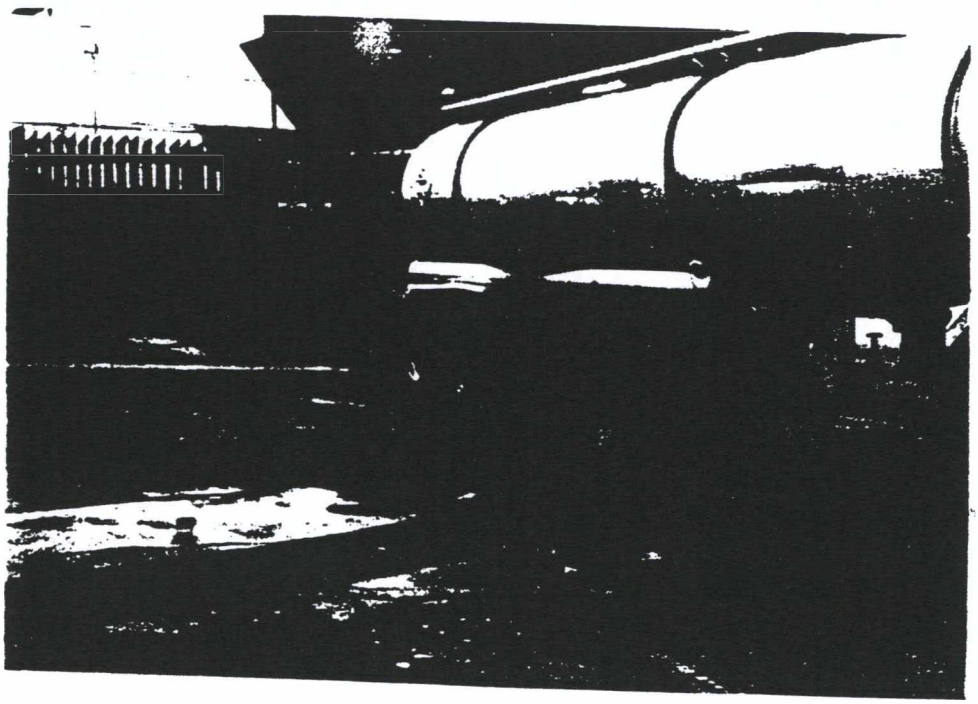


Photo 2. Oil/water separator area.

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 34
Time 1300-1500

Description Tank 94
Residue from overflow

Photographer Facing East
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 35
Time 1300-1500

Description Spill area in marine diesel oil yard
oil spill residue on tanks

Photographer Facing West
Photographer Name O'Neal

SITE NAME Chempro Pier 91

Roll No. 1
Date 3-28-88
Unit

Photo No. 36
Time 1300-1500

Description Discarded waste samples in garbage cans

Photographer Facing North
Photographer Name O'Neal

CHEMPRO PIER 91
VSI PHOTOGRAPHIC LOG
28 MARCH 1988

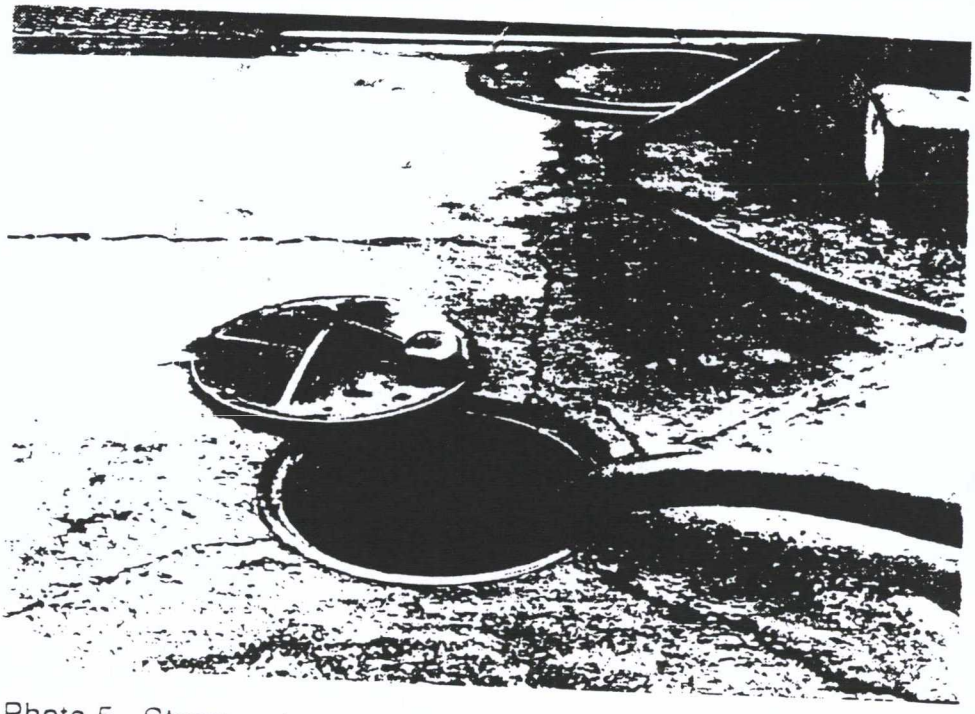


Photo 5. Storm water sump.

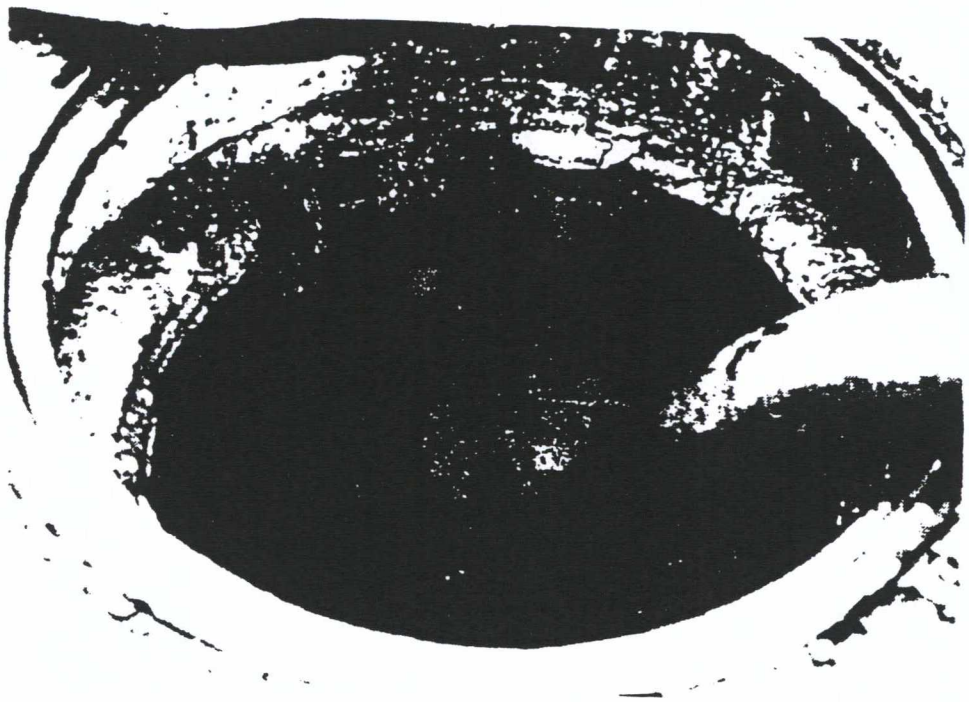


Photo 6. Storm water sump.

CHEMPRO PIER 91
VSI PHOTOGRAPHIC LOG
28 MARCH 1988

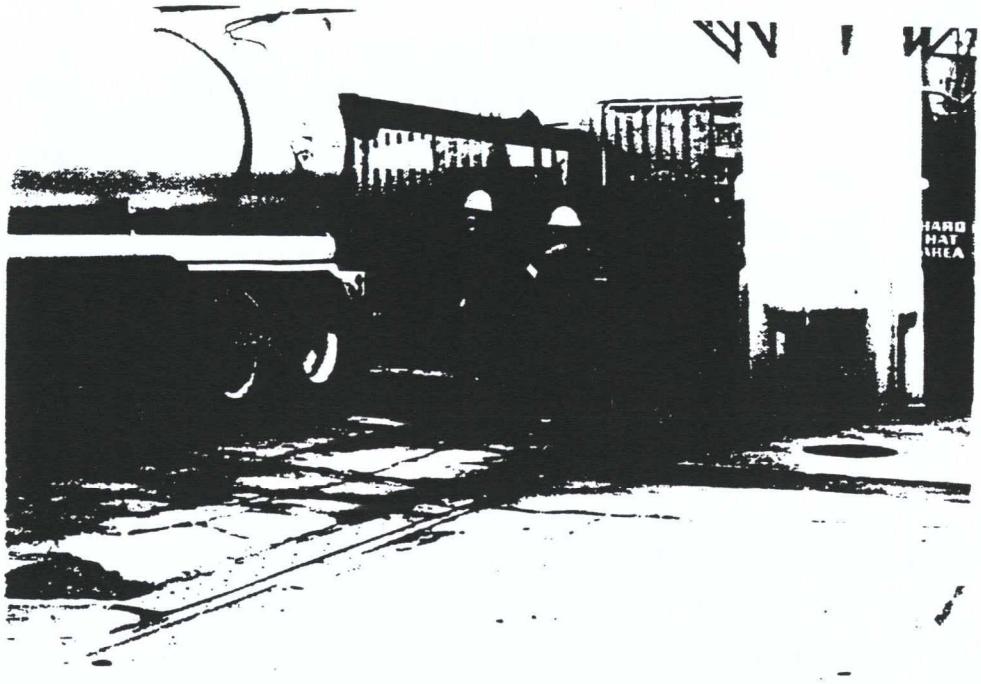


Photo 3. Oily wastewater truck off-loading area.

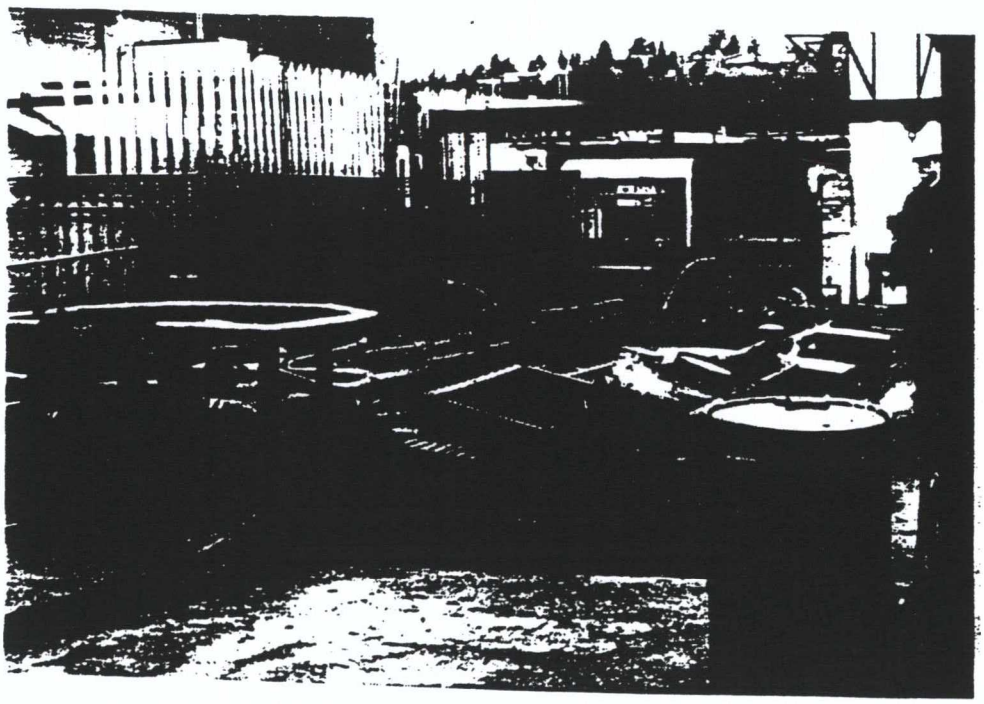


Photo 4. Oil/water separator.

CHEMPRO PIER 31
VSI PHOTOGRAPHIC LOG
28 MARCH 1988

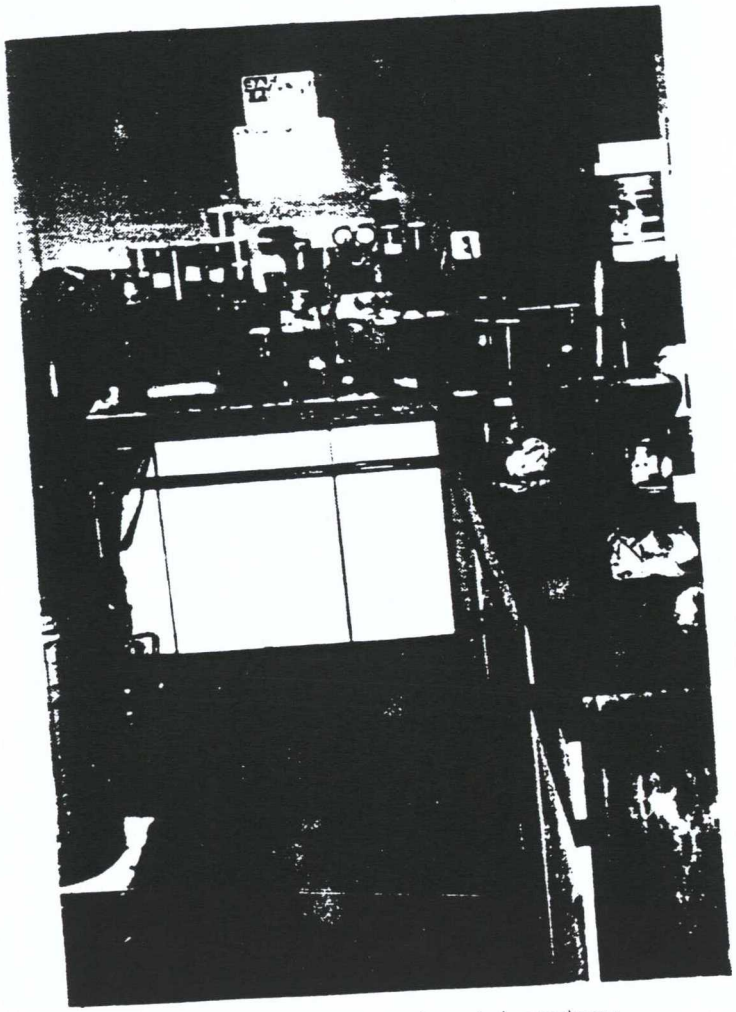


Figure 7. Operator testing laboratory.

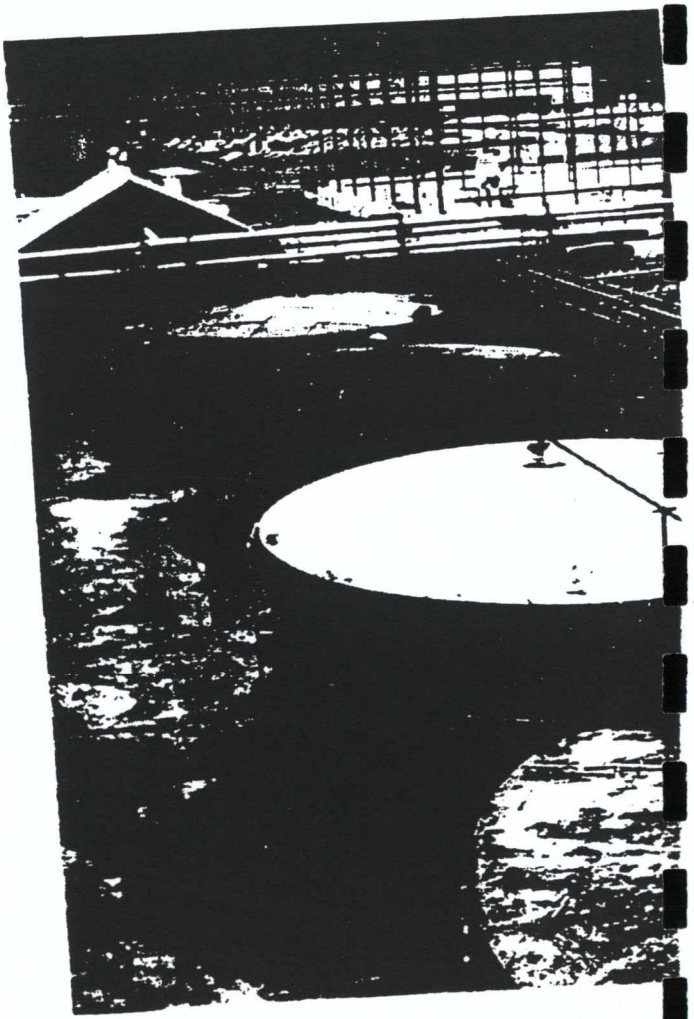


Figure 8. Small tank yard.

CHEMPRO PIER 91
VSI PHOTOGRAPHIC LOG
28 MARCH 1988

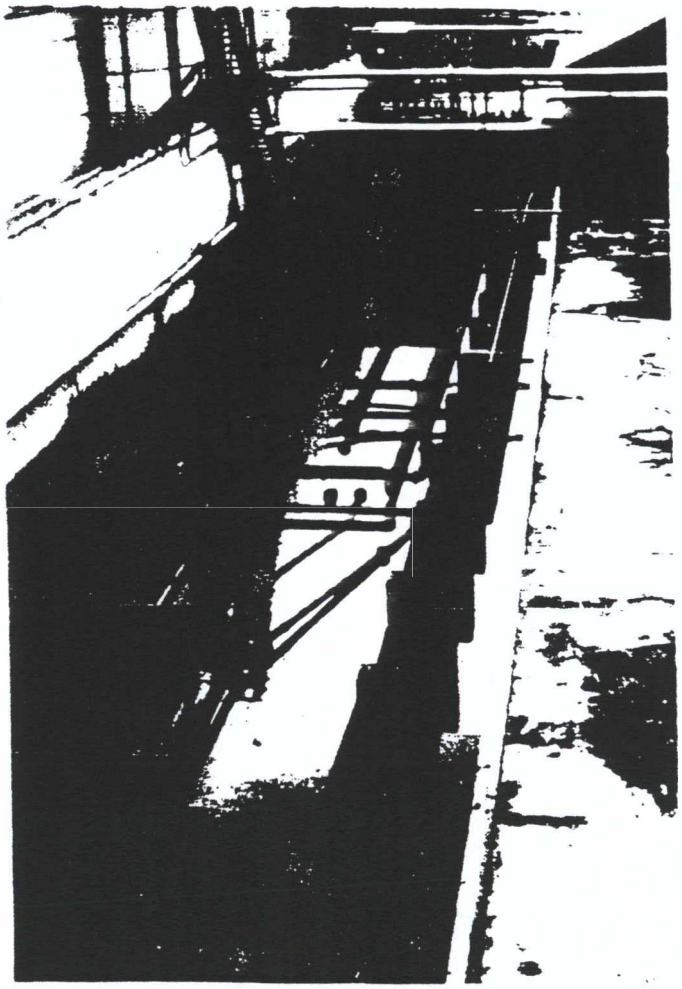


Photo 11. Pipe alley.

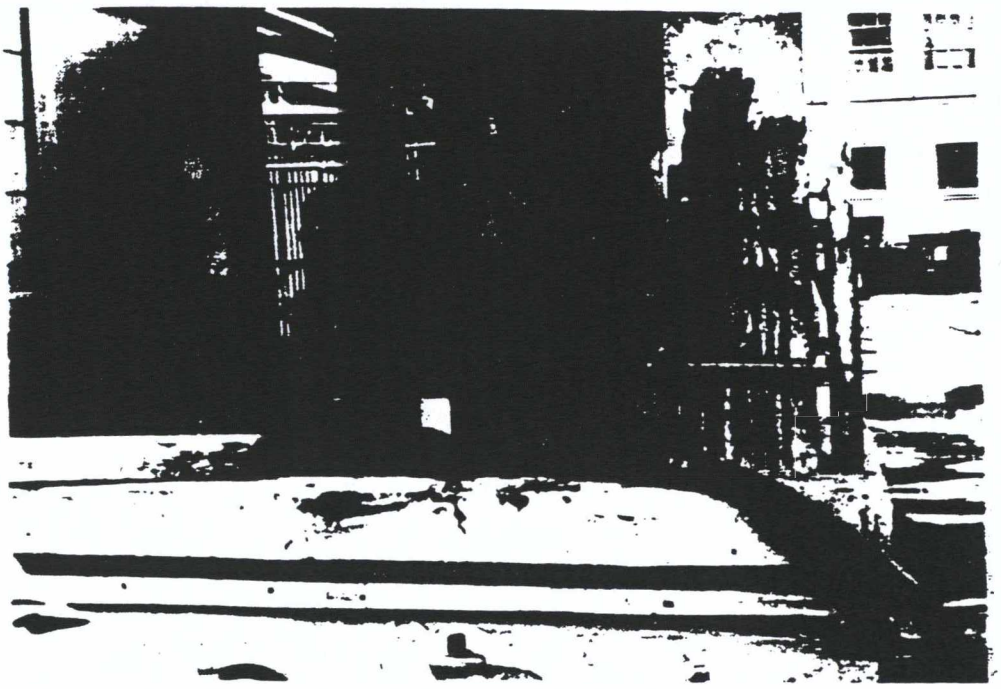


Photo 12. Sludge decanter/centrifuge.

CHEMPRO PIER 31
VSI PHOTOGRAPHIC LOG
28 MARCH 1988

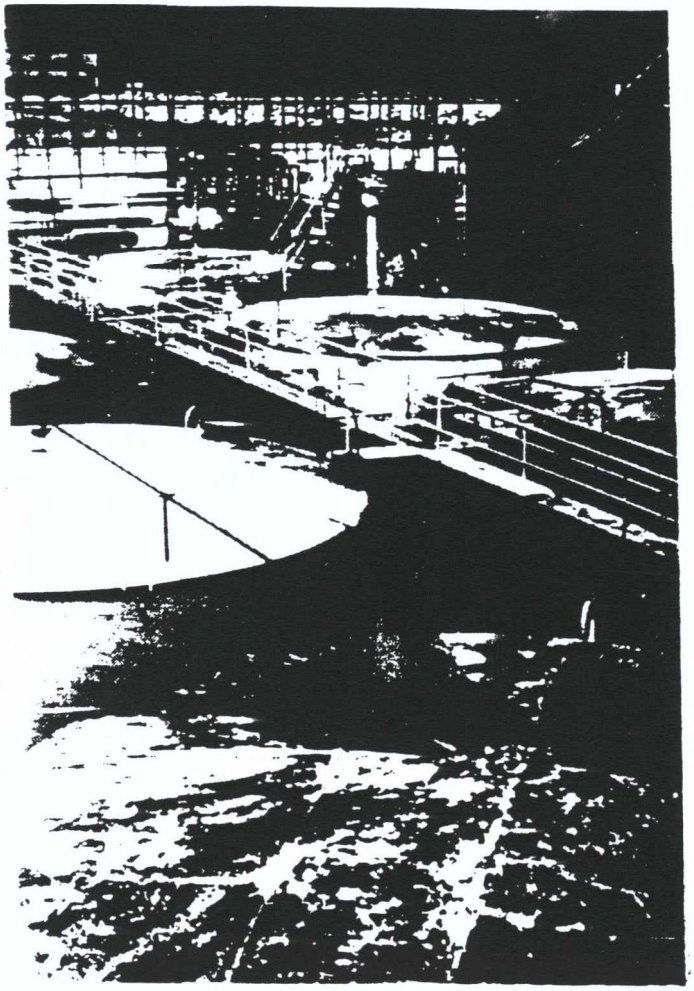


Figure 9. Small tank yard.

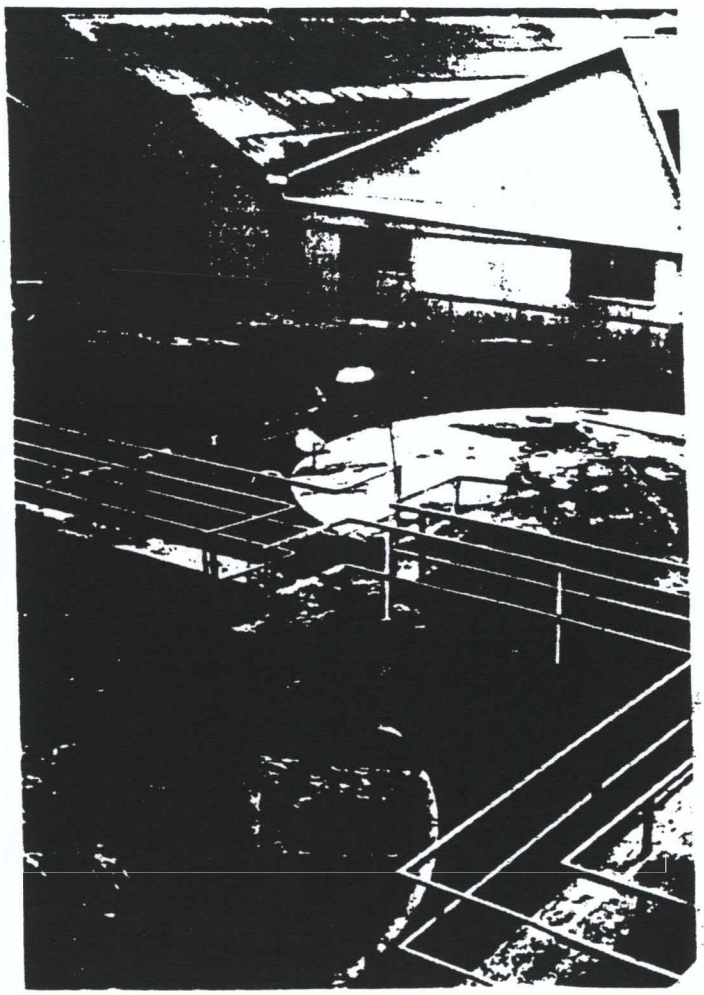


Figure 10. Small tank yard.

CHEMPRO PIER 91
VSI PHOTOGRAPHIC LOG
28 MARCH 1988

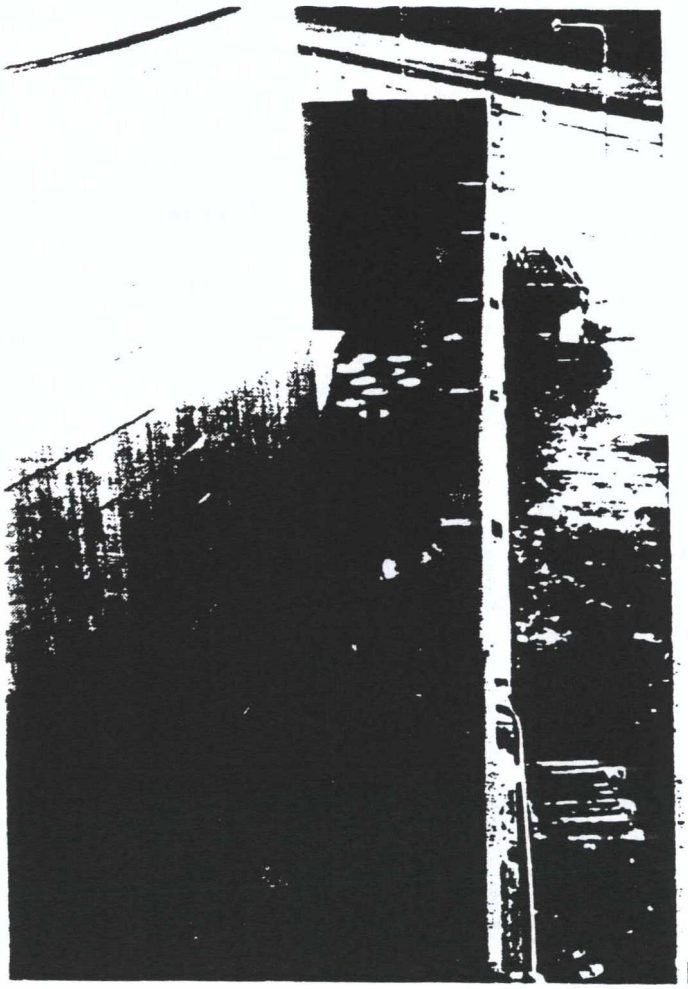


Photo 15. Marine diesel oil yard.

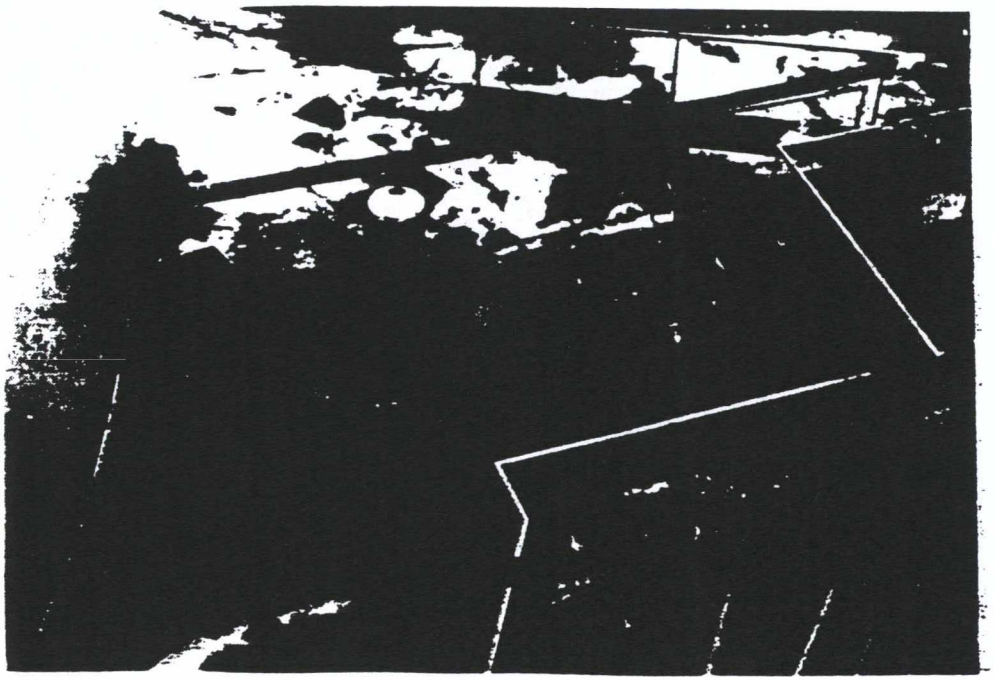


Photo 16. Wastewater sump in black oil yard.

CHEMPRO PIER 31
VSI PHOTOGRAPHIC LOG
28 MARCH 1988

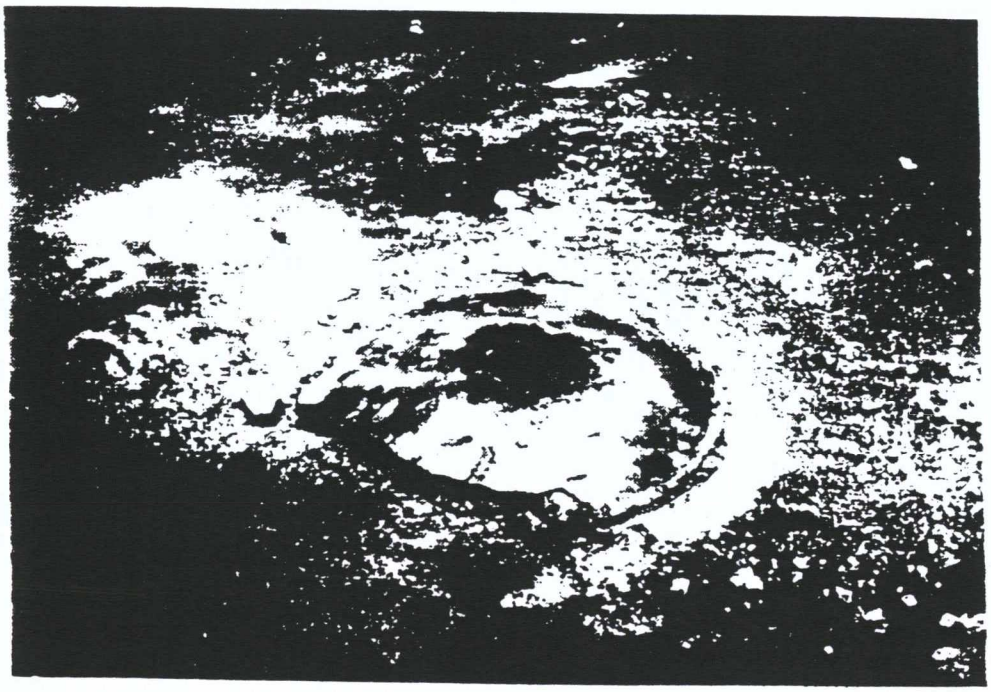


Photo 13. Groundwater well near Tank 13.

Photo 14. Marine diesel oil yard.

CHEMPRO PIER 91
VSI PHOTOGRAPHIC LOG
28 MARCH 1988

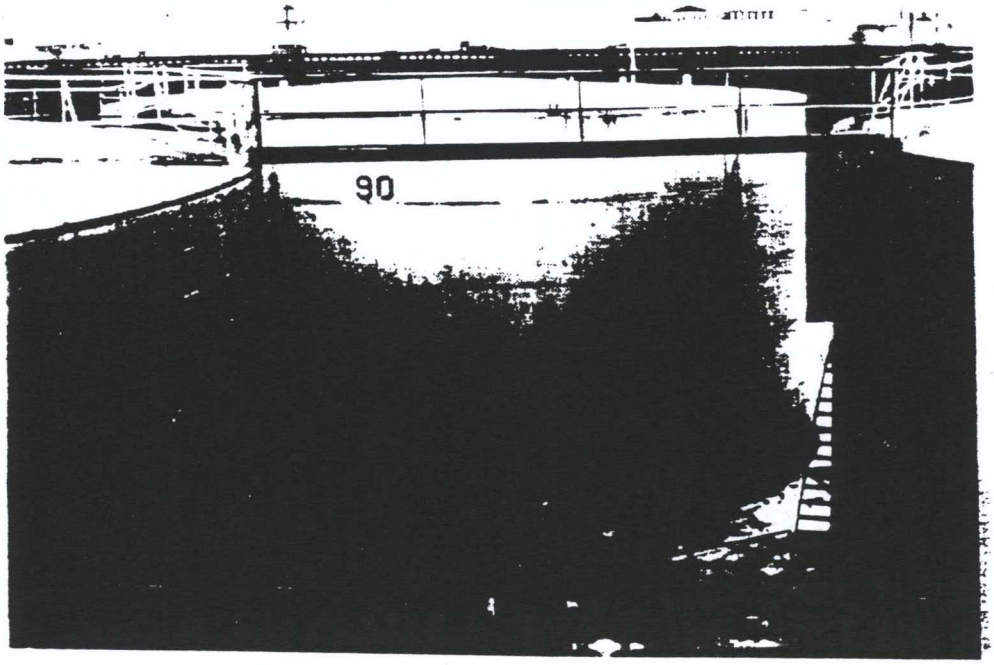


Photo 19. Oily wastewater Tank 90.

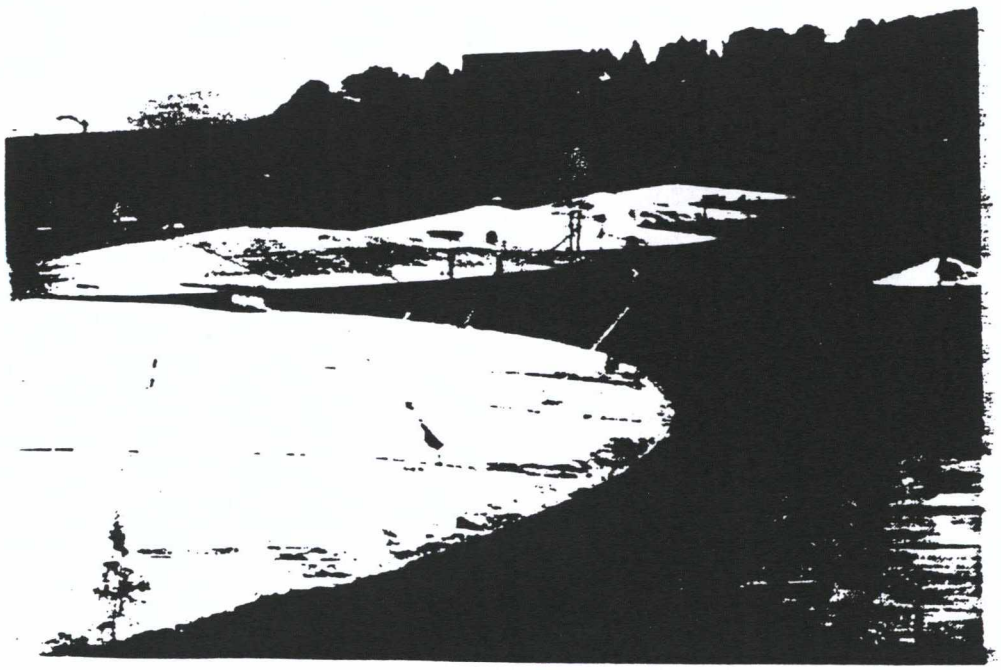


Photo 20. Marine diesel oil yard.

CHEMPRO PIER 91
VSI PHOTOGRAPHIC LOG
28 MARCH 1988

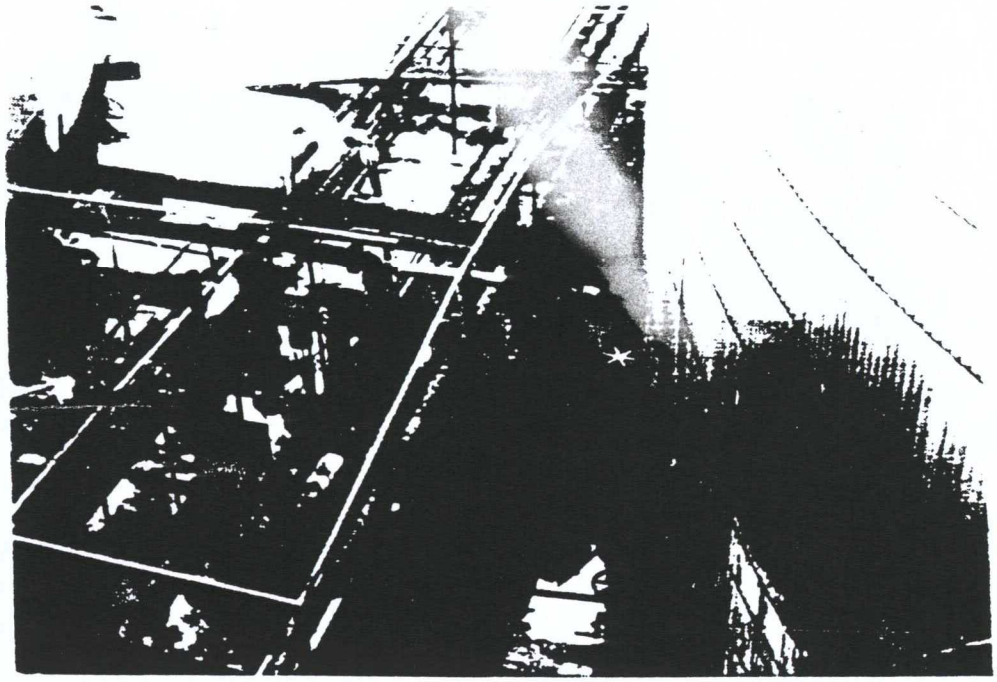


Photo 17. Wastewater sump in black oil yard.

Photo 18. Oily wastewater Tank 90.

CHEMPRO PIER 91
VSI PHOTOGRAPHIC LOG
28 MARCH 1988

Photo 25. PANOCO sump area.

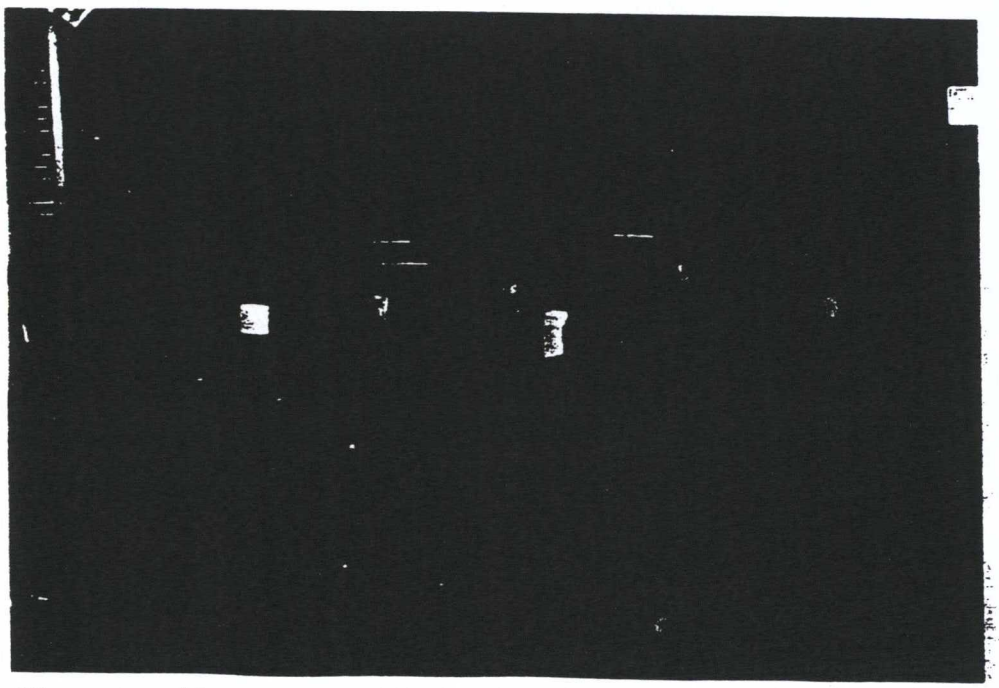


Photo 26. Hazardous waste container storage area.

CHEMPRO PIER 91
VSI PHOTOGRAPHIC LOG
28 MARCH 1988

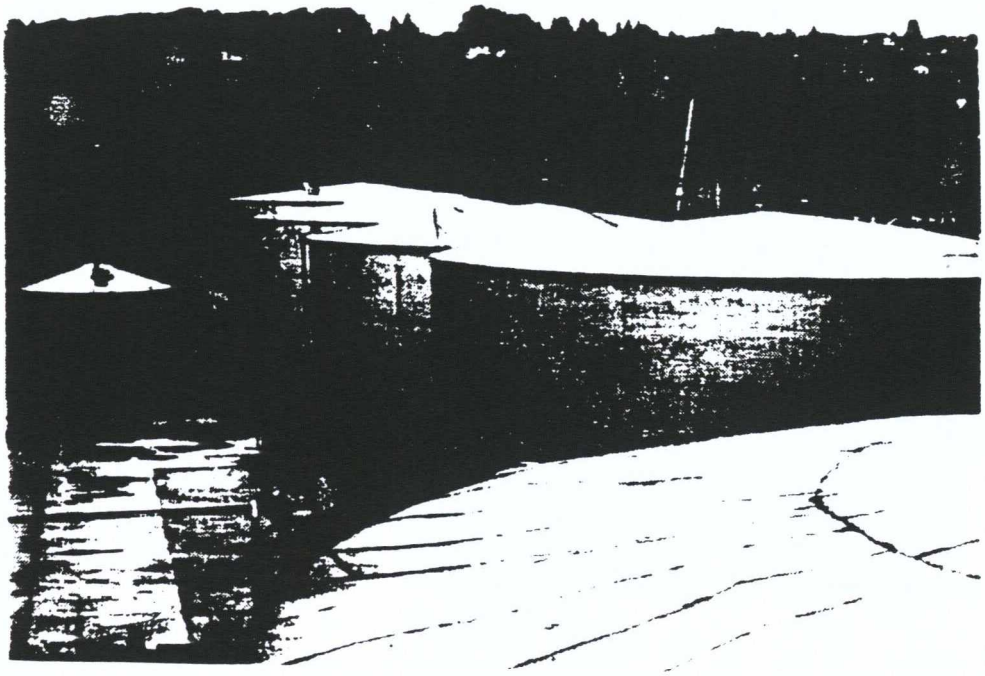


Photo 21. Marine diesel oil yard.

Photo 22. Marine diesel oil yard.

CHEMPRO PIER 91
VSI PHOTOGRAPHIC LOG
28 MARCH 1988

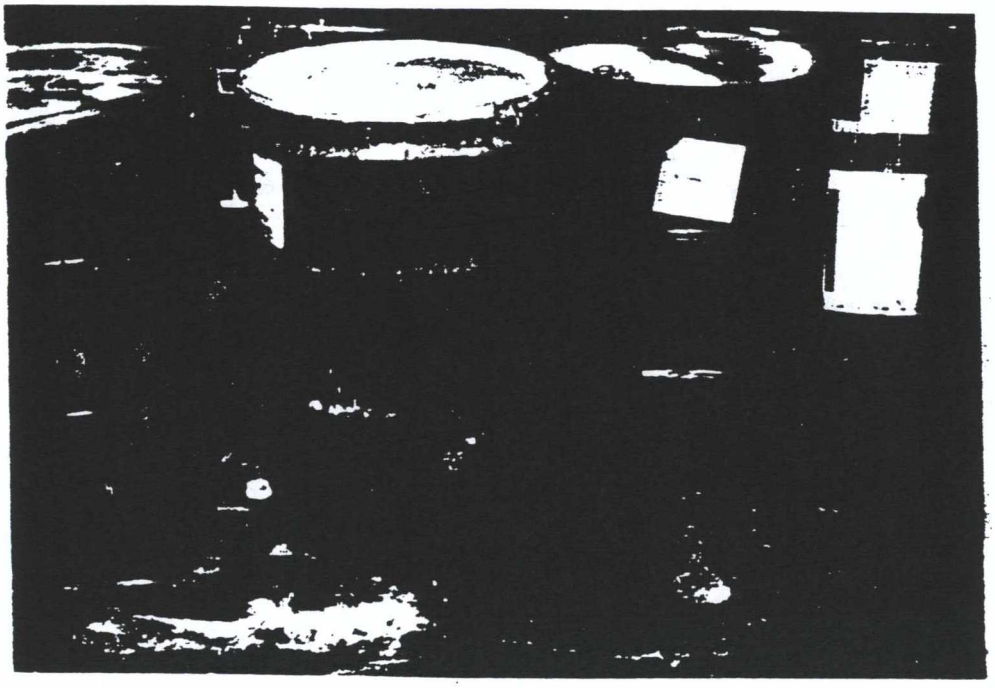


Photo 27. Leaking hazardous waste drum.

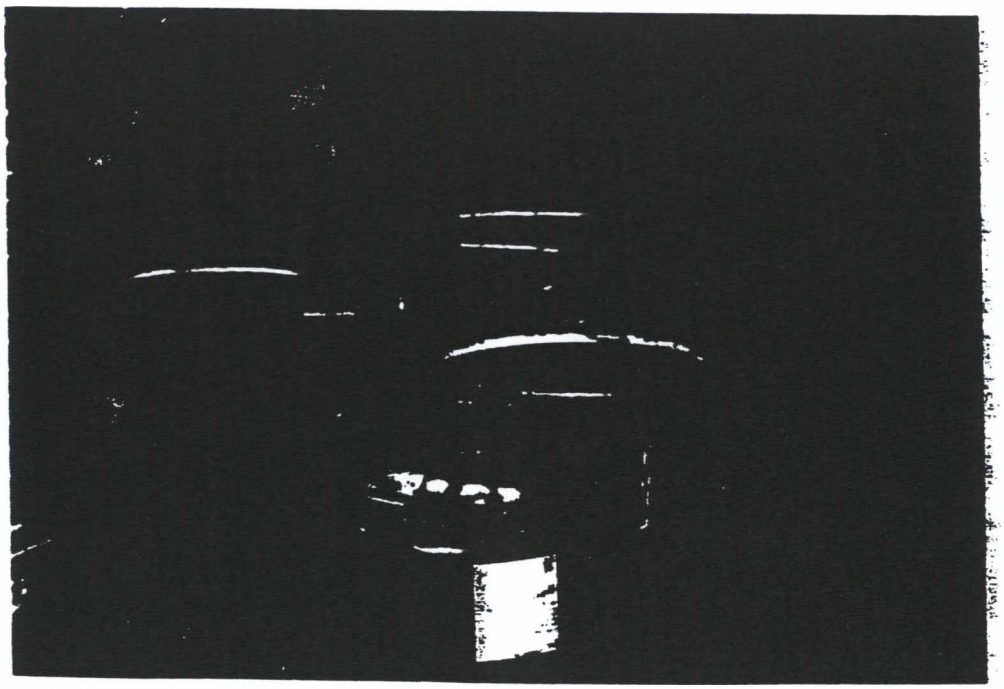


Photo 28. Hazardous waste storage drum.

CHEMPRO PIER 91
VSI PHOTOGRAPHIC LOG
28 MARCH 1988

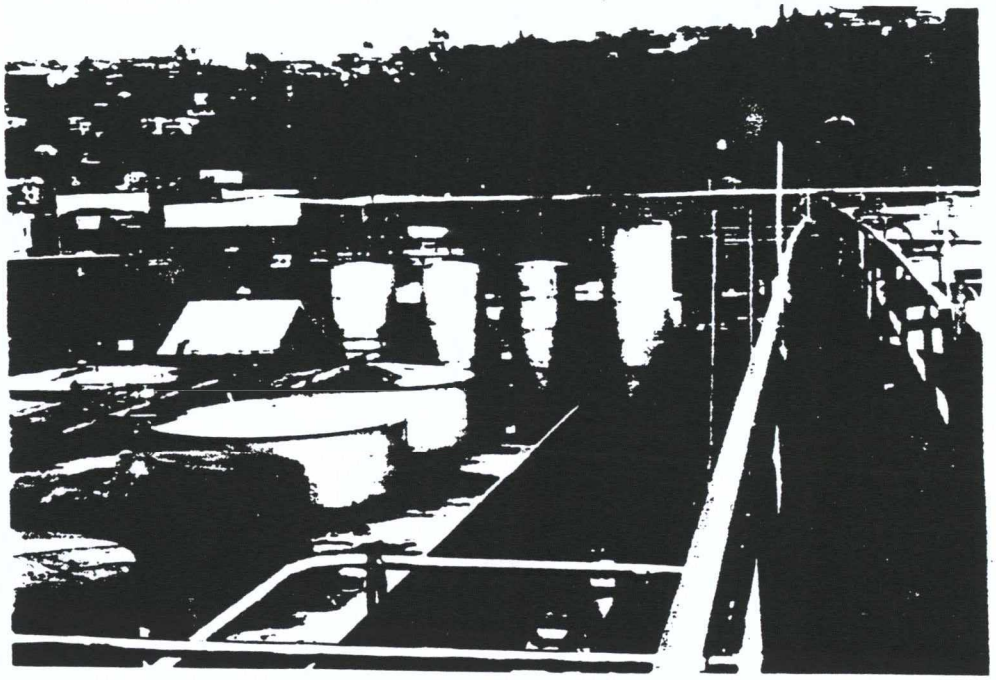


Photo 23. Waste coolant storage tanks.

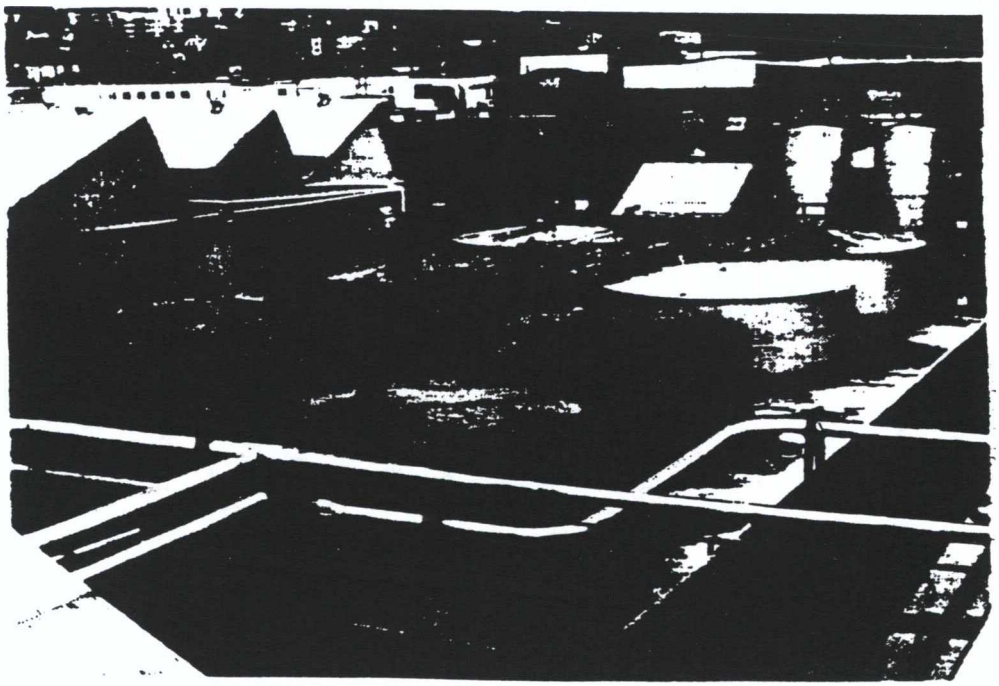


Photo 24. Small yard storage/treatment tanks.

CHEMPRO PIER 91
VSI PHOTOGRAPHIC LOG
28 MARCH 1988

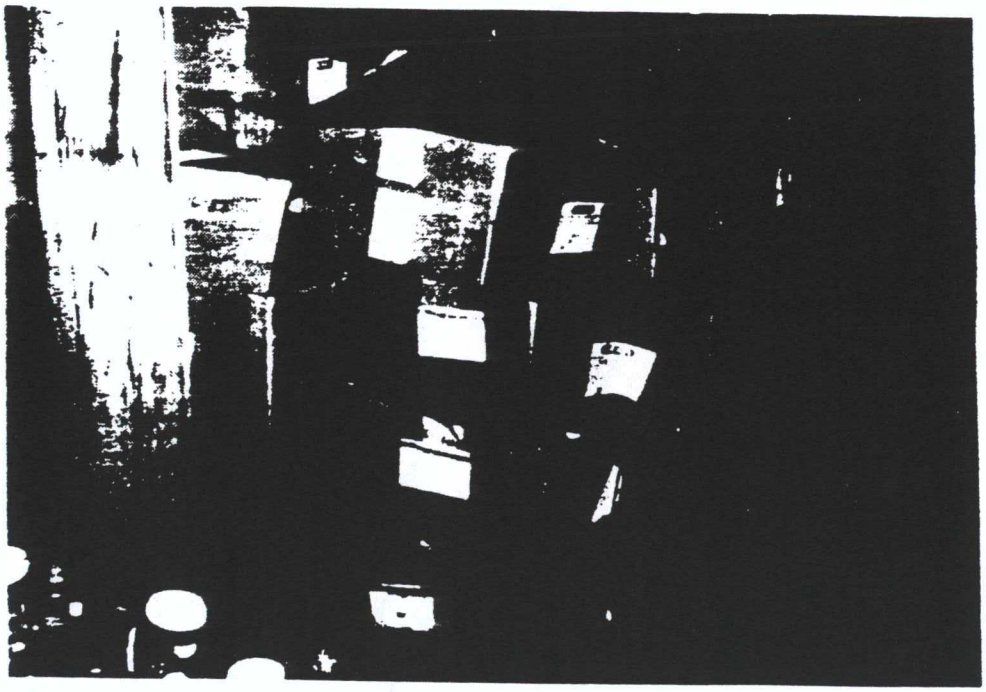


Photo 31. Sample storage area.

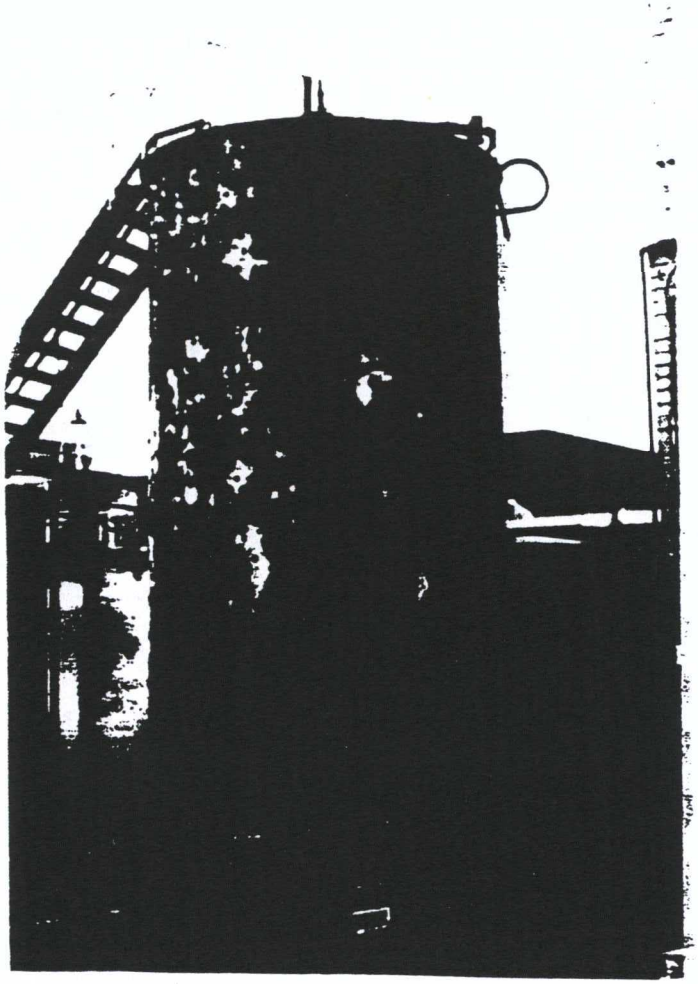


Photo 32. Coolant treatment Tank 165.

CHEMPRO PIER 91
VSI PHOTOGRAPHIC LOG
28 MARCH 1988

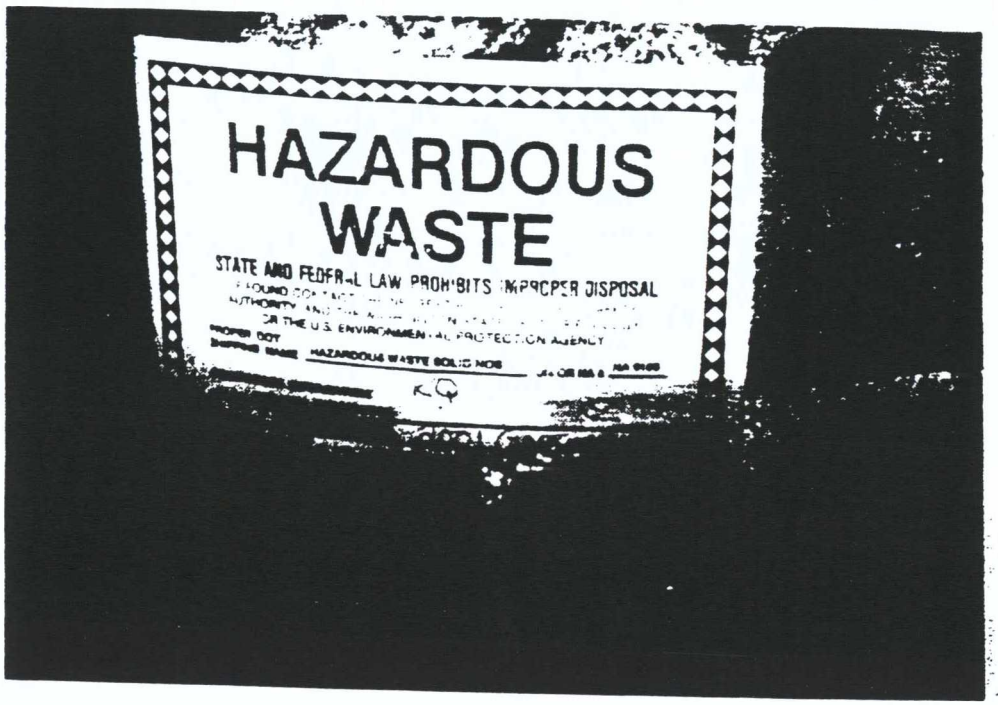


Photo 29. Label on hazardous waste drum.

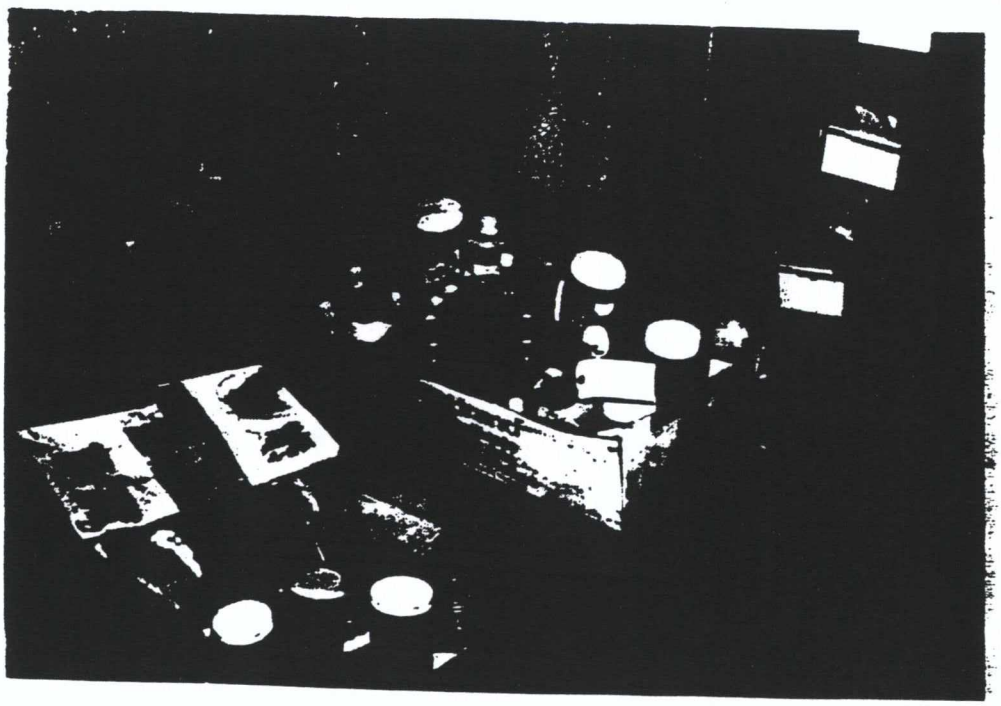


Photo 30. Sample storage area.

CHEMPRO PIER 91
VSI PHOTOGRAPHIC LOG
28 MARCH 1988

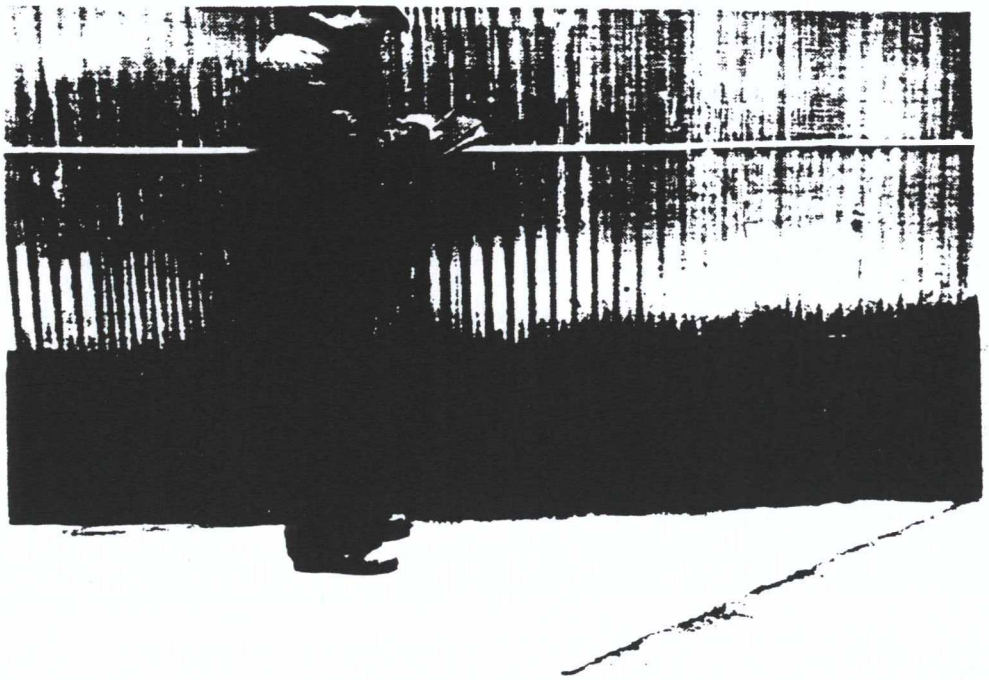


Photo 35. Spill area in marine diesel oil yard.

Photo 36. Discarded waste samples in garbage cans.

CHEMPRO PIER 91
VSI PHOTOGRAPHIC LOG
28 MARCH 1988

Photo 33. Former rec tank area.

Photo 34. Tank 94.

Sweet, Edwards & Associates, Inc.

BORING LOG

PROJECT Chempro, Pier 91 Page 1 of 1

Location See Figure 2.1 Boring No. CP-103A

Surface Elevation _____ Drilling Method Cable Tool Rig with 6" Bit

Total Depth 15' Drilled By Holt Drilling

Date Completed 12/2/87 Logged By S. R. Henshaw

WELL DETAILS	PENETRATION TIME/ RATE	DEPTH (FEET)	SAMPLE NO.	SAMPLE TYPE	PERMEABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
Flush Mount Security Casing w/Locking Cap; Concrete; Hydrated Bentonite Pellets; 2-inch Schedule 40 PVC Screen w/0.010" Slots; 8-12 Colorado Silica Sand; 2-inch Schedule 40 PVC Casing		10 20					See Boring Log CP-103-B Terminated boring at 15' as/2/87	

SEA-300-02a

APPENDIX B

GROUNDWATER MONITORING WELL LOGS

Sweet, Edwards & Associates, Inc.

BORING LOG

PROJECT Chempro, Pier 91

Boring No. CP-103-B

WELL DETAILS	PENE-TRATION TIME/ RATE	DEPTH (FEET)	SAMPLE NO.	SAMPLE TYPE	PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
		70					Cont. gray, fine grained, alternating beds of silt and sand observed in drill cuttings. 15% shell fragements (some whole shells), 5% wood debris (peat), strong H_2S odor, saturated.	
		80						
		90					Terminated boring at 69.5' 12/2/87	

Sweet, Edwards & Associates, Inc.

BORING LOG

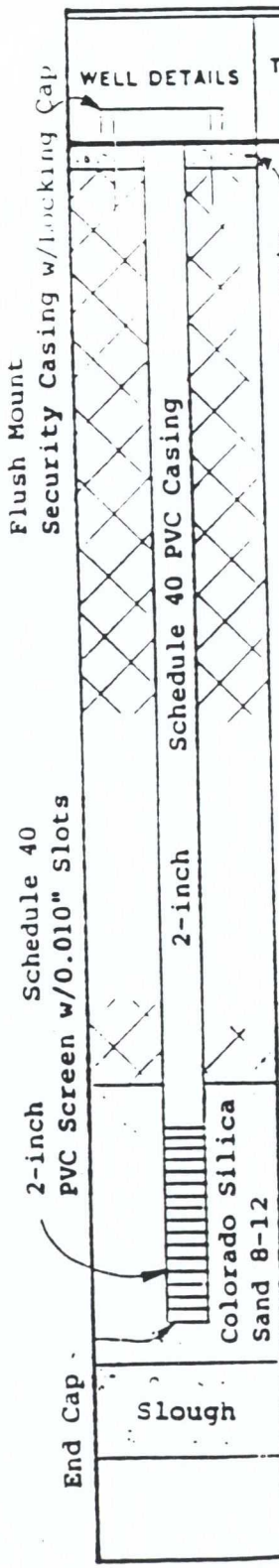
PROJECT Chemoro, Pier 91 Page 1 of 2

Location See Figure 2.1 Boring No. CP-103B

Surface Elevation _____ Drilling Method Cable Tool Rig with 6" Bit

Total Depth 69.5' Drilled By Holt Drilling

Date Completed 12/2/87 Logged By S. R. Henshaw



WELL DETAILS	PENETRATION TIME/RATE	DEPTH (FEET)	SAMPLE NO.	SAMPLE TYPE	PERMEABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
		10					0-15' GRAVELLY SAND, gray, medium to coarse grained, 20-30% gravel (basalt, quartzite) up to 4" in diameter, product observed at 10', saturated at 10'.	
		20	103-A	SPT			15-28' SILTY SAND, gray, medium grained, 15-25% silt, 5-10% sub-rounded gravel (basalt) up to 4" in diam. less than 5% shell fragm. product odor, saturated.	
		30	103-B	SPT			28-60' SAND, gray, medium grained, clean, less than 5% silt, poorly stratified, slight product odor, saturated.	
		40	103-C	SPT				
		50					50-51.5' strong H_2S odor, saturated.	
		60					60-66.5' SILTY SAND TO SANDY SILT description on following page	
		70	103-D	SPT				

Sweet, Edwards & Associates, Inc.

BORING LOG

PROJECT Chempro, Pier 91 — Page 1 of 1

Location See Figure 2.1 — **Boring No.** CP-105-A

Surface Elevation — **Drilling Method** Cable Tool Rig with 6" Bit

Total Depth 14' — **Drilled By** Holt Drilling

Date Completed 11/28/87 — **Logged By** S. R. Henshaw

WELL DETAILS	PENETRATION TIME/ RATE	DEPTH (FEET)	SAMPLE NO.	SAMPLE TYPE	PERMEABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
Flush Mount Curb Box with Locking Cap; Concrete; 2-in. Sch. 40 PVC Screen, 0.010-in slots; #8x12 Colorado Silica Sand; End Cap; 2-in. Sch. 40 PVC		10 20					See Boring Log CP-105-B Terminated boring at 14' 11/28/87	

SEA-300-02a

Sweet, Edwards & Associates, Inc.

BORING LOG

PROJECT Chempro, Pier 91 **Page** 1 **of** 1

Location See Figure 2.1 **Boring No.** CP-104A

Surface Elevation _____ **Drilling Method** Mobil B-56 with 4.25" I.D. 7.5"O.D. Hollow Stem Auger

Total Depth 15' **Drilled By** Tacoma Pump & Drilling

Date Completed 11/28/87 **Logged By** S. R. Henshaw

WELL DETAILS	PENETRATION TIME/ RATE	DEPTH (FEET)	SAMPLE NO.	SAMPLE TYPE	PERMEABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
			No	Sample			0-10' SAND, medium grained, cuttings became wet at 6', gray.	
		10	101-A	SPT		GW	10-12' SILTY SAND, 10-20% subrounded gravel, less than 5% shell fragments, medium to coarse grained sand, gray, gravels are basalts, quartzite, metavolcanics, product odor, saturated.	
			No	Sample				
		20				SM	12-15' SILTY SAND, 5-10% pebble size sand, 60% medium sand, 30% silt, gray, strong product odor, saturated.	
							Terminated boring at 15' 11/28/87	

Sweet, Edwards & Associates, Inc.

BORING LOG

PROJECT Chempro, Pier 91 — Page 1 of 1

Location See Figure 2.1 — **Boring No.** CP-106

Surface Elevation — **Drilling Method** Mobil B-56 with 4.25" I.D. 7.5"O.D. Hollow Stem Auge

Total Depth 15' — **Drilled By** Tacoma Pump & Drilling

Date Completed 11/28/87 — **Logged By** S. R. Henshaw

WELL DETAILS	PENE-TRATION TIME/ RATE	DEPTH (FEET)	SAMPLE NO.	SAMPLE TYPE	PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
Flush Mount Security Casing w/ locking Cap; Concrete; Hydrated Bentonite Chips; 2-in. Sch. 80 PVC Casing; End Cap; #8x12 Colorado Silica Sand; 2-inch Sch. 80 PVC Screen 0.010-in. Slots		10	106-A	SPT			Concrete Pavement 2-15' SAND, dark gray, fine to medium grained, less than 5% shell fragments, 5-10% silt, product odor, saturated. 12-15' increasing gravels up to 4".	
		20	No Sample				Terminated boring at 15' 11/28/87	

SEA-300-02a

Sweet, Edwards & Associates, Inc.

BORING LOG

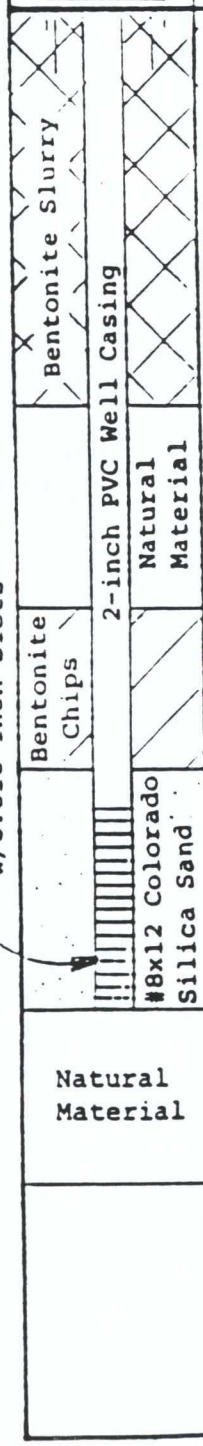
PROJECT Chempro, Pier 91 — Page 1 of 1

Location See Figure 2.1 — **Boring No.** 105B

Surface Elevation — **Drilling Method** 71 Speedster Cable Rig with 8" & 6" bits

Total Depth 58.5 — **Drilled By** Holt Drilling

Date Completed 11/27/87 — **Logged By** S. R. Henshaw



WELL DETAILS	PENETRATION TIME/ RATE	DEPTH (FEET)	SAMPLE NO.	SAMPLE TYPE	PERMEABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
							Concrete Pavement	
		10	A	SPT		SM	2-30' SILTY SAND, medium brown, medium grained, poorly sorted, some gravel, shell fragments, poorly consolidated, moist.	
			B	BAIL				
		20	C	SPT			---light gray to black, subrounded gravel to 2" diameter, wood debris, trace shell fragments, saturated.	
			D	SPT		SW	21-30' GRAVELLY SAND, dark gray to black, fine to coarse sand, gravels to 2" diameter, saturated.	
		30	E	SPT		SM	30-44' SILTY SAND, medium gray, fine to medium grained, some subrounded gravel, some shell fragments, hydrogen sulfide odor, saturated.	
		40				ML	44-58.5' SILT, brown to black, some medium sand, some wood debris, saturated	
		50	F	SPT				
		60					Terminated boring at 58.5' 11/27/87	

SEA-300-02a

APPENDIX C

CHEMPRO GENERATOR'S WASTE MATERIAL PROFILE DATA

Table 3.1

Summary of Water Levels

Well Number	Elevation Top of PVC*	Depth to Water 12/14/87	Depth to Water 12/4/87	Depth to Water 12/5/87
CP-103-A	11.19	--	6.35	6.41
CP-103-B	11.24	--	7.85	8.02
CP-104-A	11.37	--	6.75	5.69
CP-105-A	11.88	6.40	5.78	5.78
CP-105-B	11.90	6.75	6.09	6.00
CP-106-A	12.01	--	5.45	5.49
B-101	--	--	6.03	--
B-102	--	--	8.00**	--

* Elevation above mean sea level.

** Well casing broken.

APPENDIX C

WASTE MATERIAL PROFILE STANDARDS

Physical state	solid
Free liquids	No
Specific Gravity	0.8-1.4
Flashpoint	>140°F
Arsenic	0-1,000 ppm
Barium	0-5 ppm
Cadmium	0-10 ppm
Chromium	0-10 ppm
Mercury	0-100 ppm
Lead	0-10,000 ppm
Chromium (+6)	0-1,000 ppm
Selenium	0-500 ppm
Silver	0-500 ppm
Copper	0-10,000 ppm
Nickel	0-10 ppm
Zinc	0-10 ppm
Thallium	0-100 ppm

APPENDIX B

PHOTOLOG

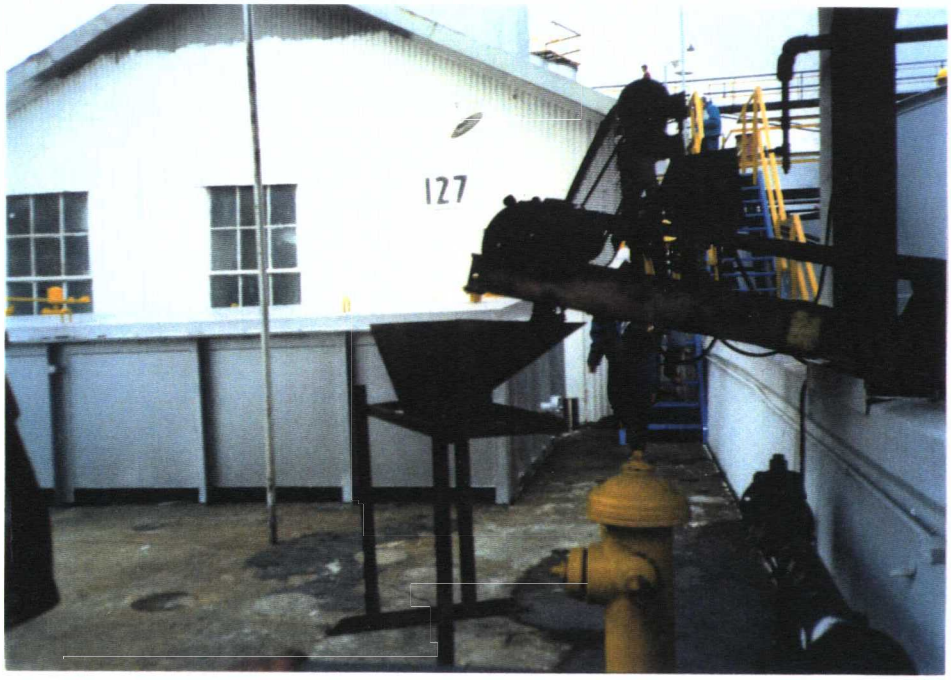
Photograph: 1	Date: October 20, 1992	Taken By: Noushin Arab
Description: Chempro/Burlington Tank 164 (SWMU 18)		

Photograph: 2	Date: October 20, 1992	Taken By: Noushin Arab
Description: Sewer line at Burlington (SWMU 19)		

Photograph: 3	Date: October 20, 1992	Taken By: Noushin Arab
Description: Burlington API Gravity Separator (SWMU 20)		

Photograph: 4	Date: October 21, 1992	Taken By: Noushin Arab
Description: Abandoned oil/water separator end of Pier 91 (SWMU 41)		

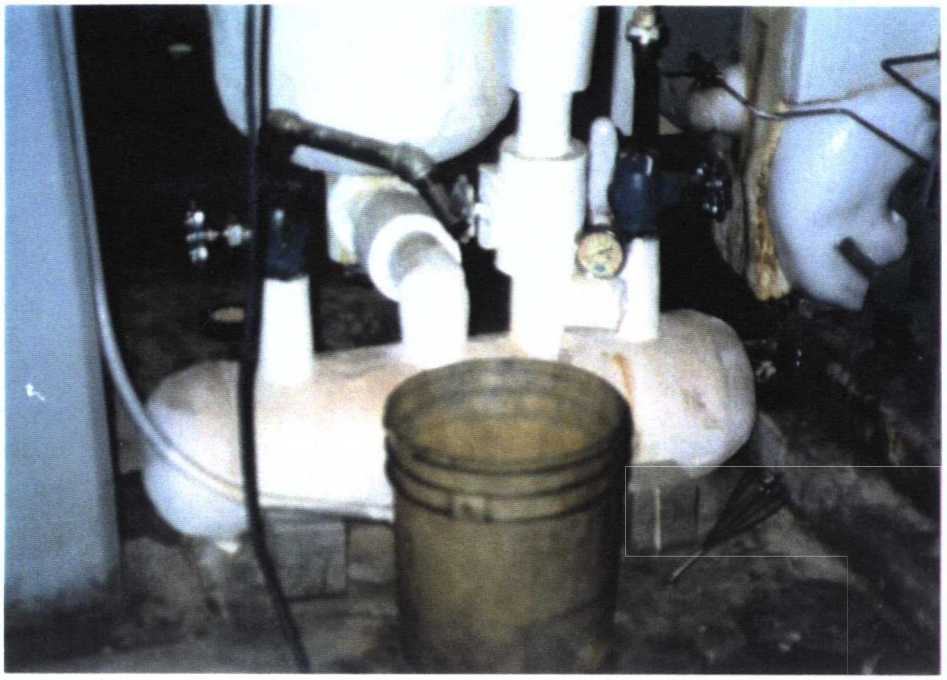
Photograph: 5	Date: October 20, 1992	Taken By: Noushin Arab
Description: Concrete berms at PANOCO (SWMU 28)		



Photograph: 6	Date: October 20, 1992	Taken By: Noushin Arab
Description: PANOCO building 127 (SWMU 29)		

Photograph: 7	Date: October 20, 1992	Taken By: Noushin Arab
Description: PANOCO liquid hydrocarbon recovery system (SWMU 31)		

Photograph: 8	Date: October 20, 1992	Taken By: Noushin Arab
Description: PANOCO oil blending station (SWMU 32)		



Photograph: 9	Date: October 21, 1992	Taken By: Noushin Arab
Description: Waste oil buckets used at City Ice and Cold Storage Co. (SWMU 34)		

Photograph: 10	Date: October 21, 1992	Taken By: Noushin Arab
Description: Waste oil storage container at City Ice and Cold Storage Co. (SWMU 34)		

Photograph: 11	Date: October 21, 1992	Taken By: Noushin Arab
Description: Waste oil storage tank at City Ice and Cold Storage Co. (SWMU 34)		

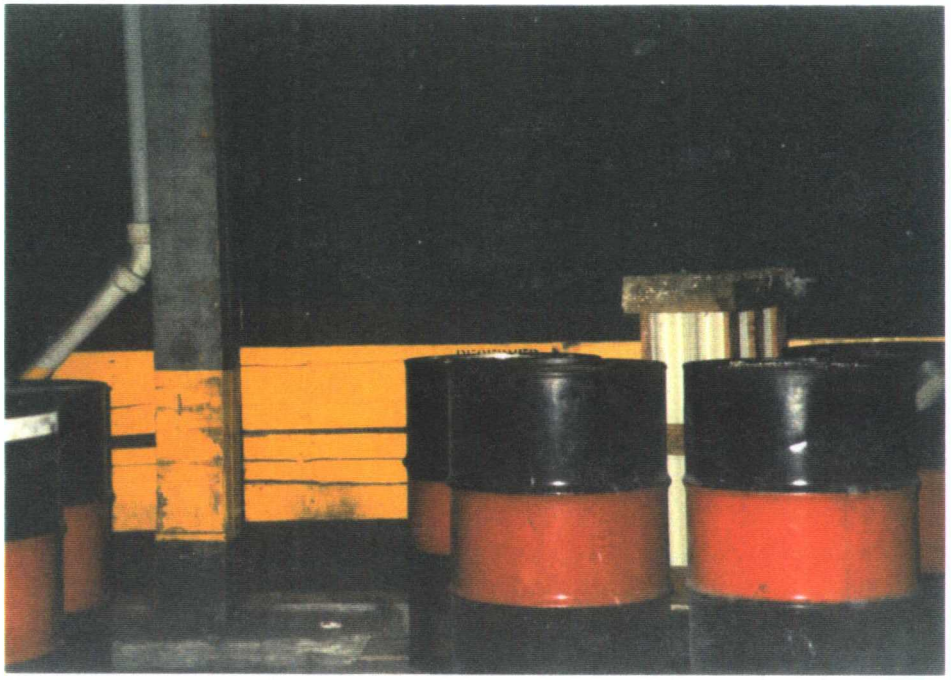
Photograph: 12	Date: October 21, 1992	Taken By: Noushin Arab
Description: 55-gallon drums outside building W-47 (SWMU 35)		

Photograph: 13	Date: October 21, 1992	Taken By: Noushin Arab
Description: Old refrigeration unit outside building W-47 (SWMU 35)		

Photograph: 14	Date: October 21, 1992	Taken By: Noushin Arab
Description: 55-gallon drum of transformer oil outside building W-47 (SWMU 35)		

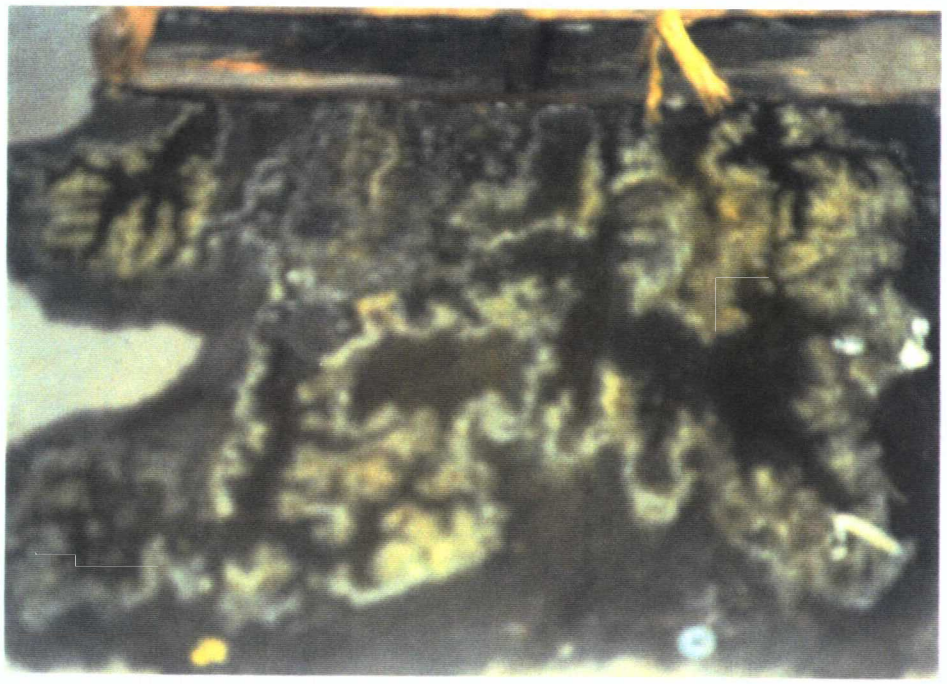
Photograph: 15	Date: October 21, 1992	Taken By: Noushin Arab
Description: 15 foot-tall bin with unknown contents (SWMU 35)		

Photograph: 16	Date: October 21, 1992	Taken By: Noushin Arab
Description: 55-gallon drums labeled "concrete curing" (SWMU 35)		



Photograph: 17	Date: October 21, 1992	Taken By: Noushin Arab
Description: 55-gallon drums of product motor oil inside building W-47 (SWMU 36)		

Photograph: 18	Date: October 21, 1992	Taken By: Noushin Arab
Description: Containers of mineral acids inside building W-47 (SWMU 36)		

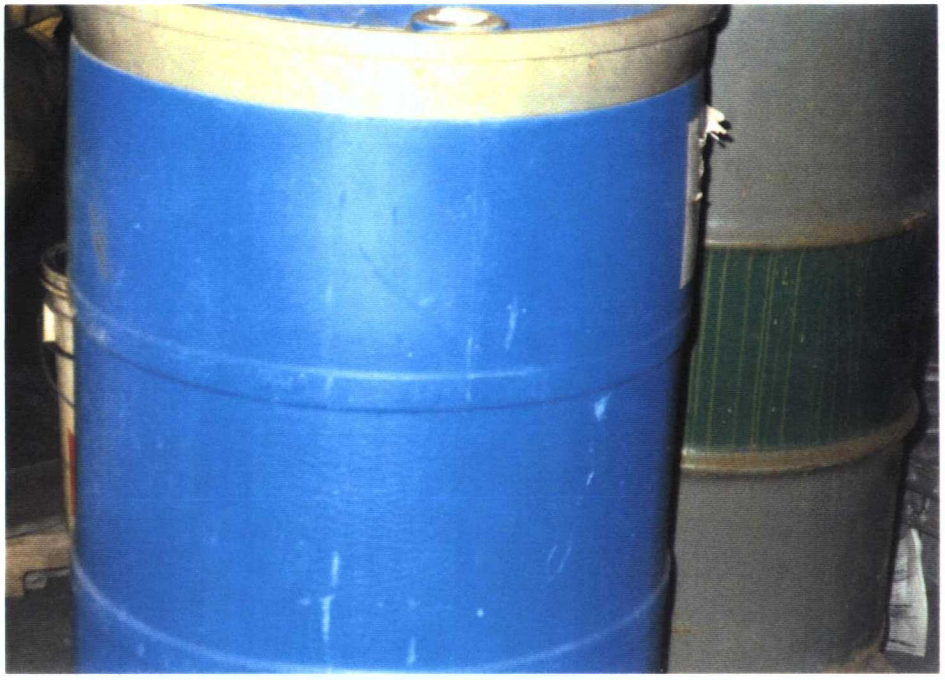


Photograph: 19	Date: October 21, 1992	Taken By: Noushin Arab
Description: Release of mineral acids on the concrete inside building W-47 (SWMU 36)		

Photograph: 20	Date: October 21, 1992	Taken By: Noushin Arab
Description: Containers of mineral thinner inside building W-47 (SWMU 36)		

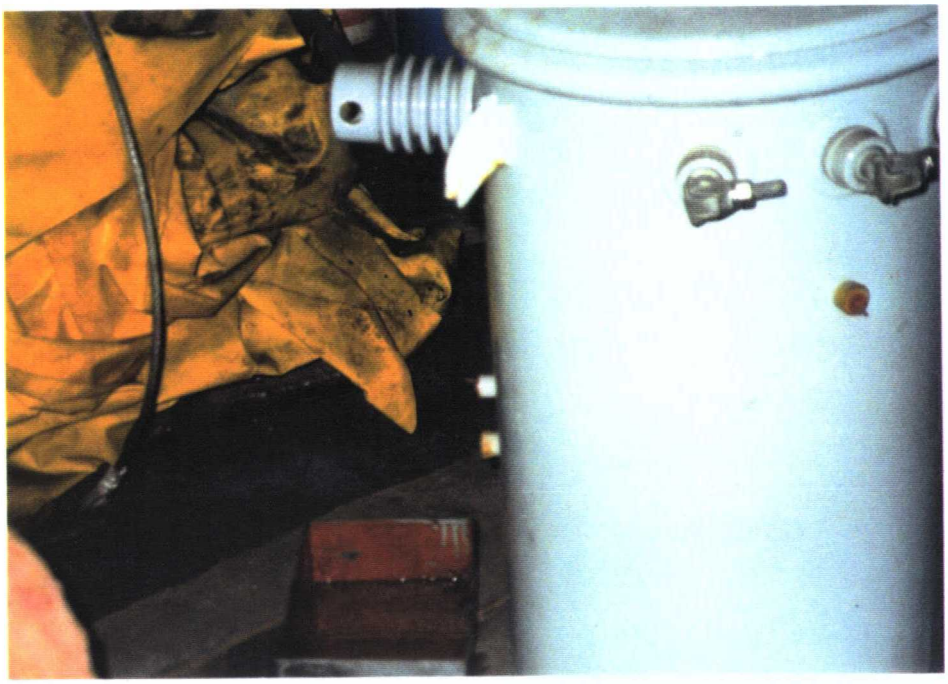
Photograph: 21	Date: October 21, 1992	Taken By: Noushin Arab
Description: 55-gallon drums of unknown content inside building W-47 (SWMU 36)		

Photograph: 22	Date: October 21, 1992	Taken By: Noushin Arab
Description: 55-gallon drum with unknown content inside building W-47 (SWMU 36)		

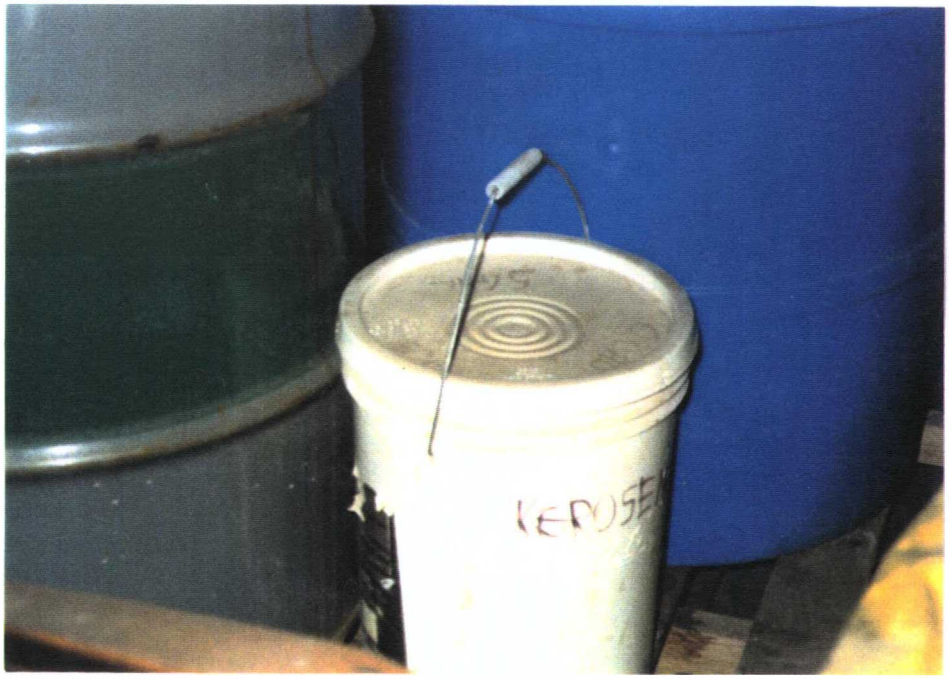


Photograph: 23	Date: October 21, 1992	Taken By: Noushin Arab
Description: 55-gallon drums of unknown content inside building W-47 (SWMU 36)		

Photograph: 24	Date: October 21, 1992	Taken By: Noushin Arab
Description: 55-gallon drums of unknown content inside building W-47 (SWMU 36)		



Photograph: 25	Date: October 21, 1992	Taken By: Noushin Arab
Description: Transformer and drip pan inside building W-47 (SWMU 36)		



Photograph: 26	Date: October 21, 1992	Taken By: Noushin Arab
Description: Kerosene container inside building W-47 (SWMU 36)		

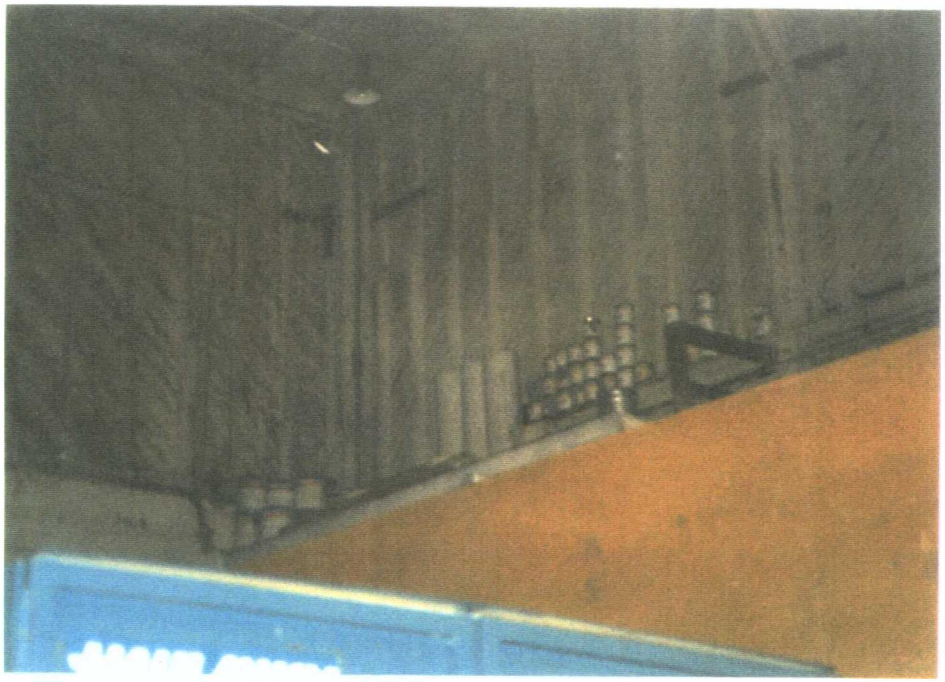
Photograph: 27	Date: October 21, 1992	Taken By: Noushin Arab
Description: Container of fiberglass compounds (SWMU 36)		

Photograph: 28	Date: October 21, 1992	Taken By: Noushin Arab
Description: Container of resin solution inside building W-47 (SWMU 36)		

Photograph: 29	Date: October 21, 1992	Taken By: Noushin Arab
Description: Buckets which their labels could not be read in the dark (SWMU 36)		

Photograph: 30	Date: October 21, 1992	Taken By: Noushin Arab
Description: Miscellaneous wastes inside building W-47 (SWMU 36)		

Photograph: 31	Date: October 21, 1992	Taken By: Noushin Arab
Description: Miscellaneous wastes inside building W-47 (SWMU 36)		

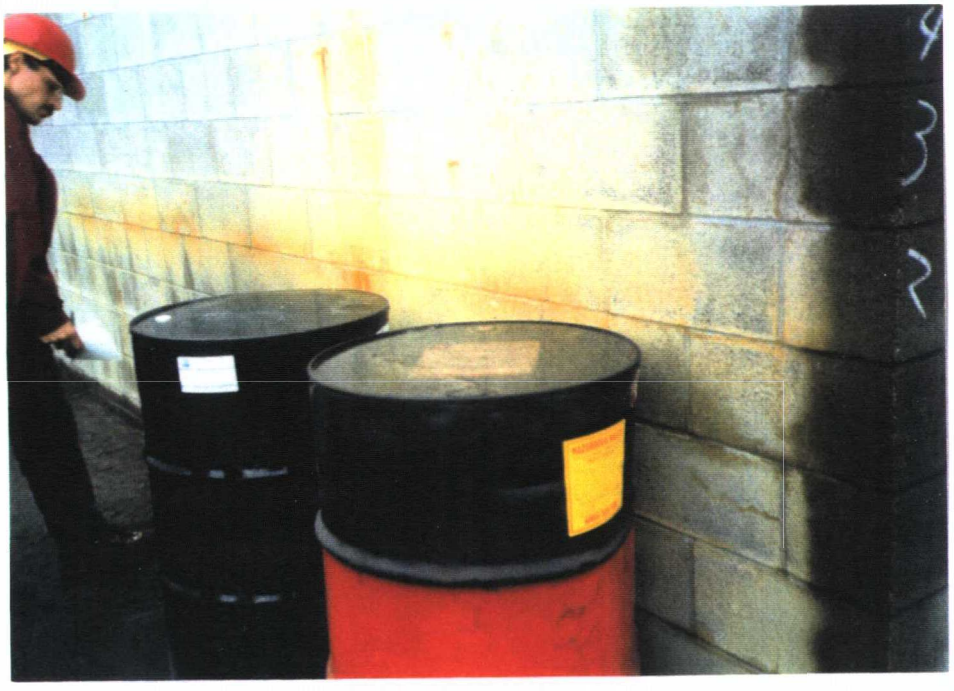


Photograph: 32	Date: October 21, 1992	Taken By: Noushin Arab
Description: Paint buckets near ceiling of building W-47 (SWMU 36)		

Photograph: 33	Date: October 21, 1992	Taken By: Noushin Arab
Description: 55-gallon drums with unknown contents next to ceiling of building W-47 (SWMU 36)		

Photograph: 34	Date: October 21, 1992	Taken By: Noushin Arab
Description: Miscellaneous food items and rubbish inside building W-47 (SWMU 36)		

Photograph: 35	Date: October 20, 1992	Taken By: Noushin Arab
Description: Car wash station at DAS (SWMU 37)		



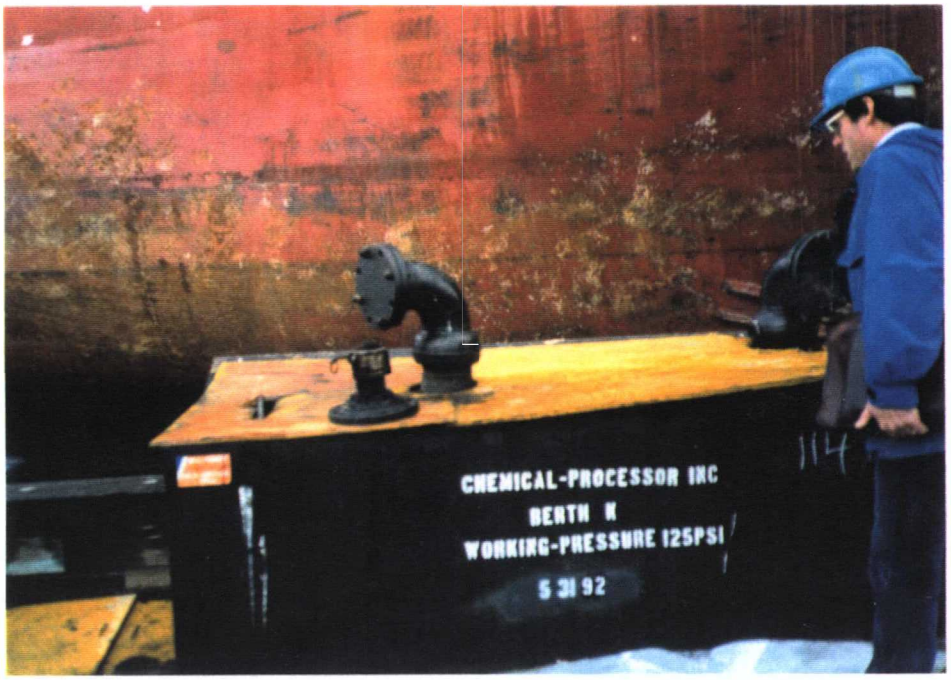
Photograph: 36	Date: October 20, 1992	Taken By: Noushin Arab
Description: Paint and motor oil waste in 55-gallon drums at DAS (SWMU 38)		

Photograph: 37	Date: October 20, 1992	Taken By: Noushin Arab
Description: An inactive heat exchanger under the freeway and a 55-gallon drum next to sewer discharge (SWMU 41)		

Photograph: 38	Date: October 20, 1992	Taken By: Noushin Arab
Description: Battery pack under freeway (SWMU 41)		

Photograph: 39	Date: October 20, 1992	Taken By: Noushin Arab
Description: 55-gallon drum with unknown content under the freeway (SWMU41)		

Photograph: 40	Date: October 20, 1992	Taken By: Noushin Arab
Description: 55-gallon drums labeled "nonhazardous but petroleum-contaminated waste" (SWMU 42)		



Photograph: 41	Date: October 20, 1992	Taken By: Noushin Arab
Description: Berth station located inside a steelbox on concrete surface (SWMU 43)		

Photograph: 42	Date: October 20, 1992	Taken By: Noushin Arab
Description: Transfer piping outside Black Oil Yard (SWMU 48)		

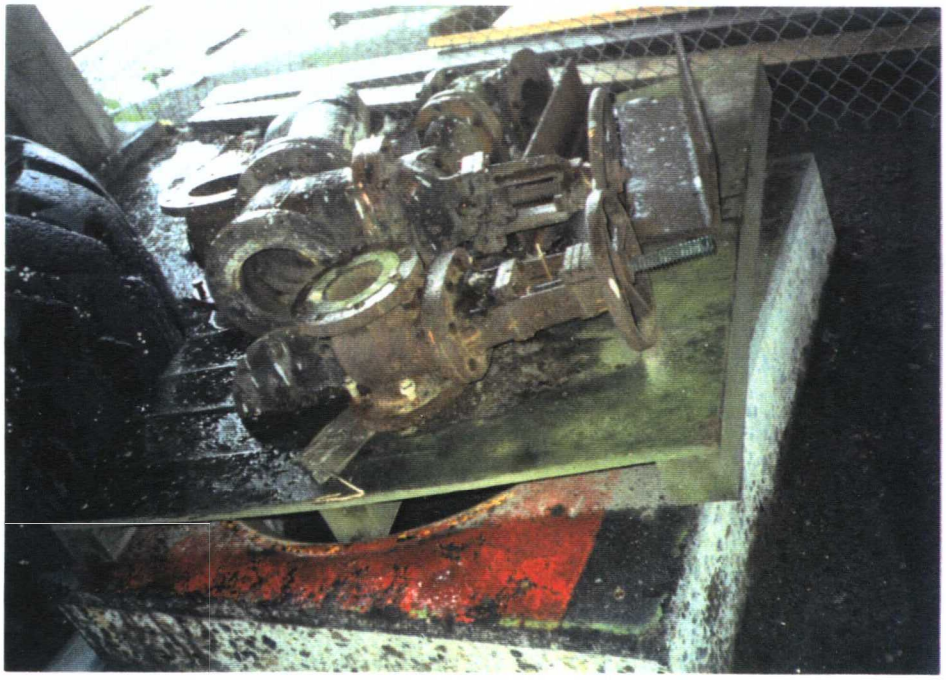
Photograph: 43	Date: October 21, 1992	Taken By: Noushin Arab
Description: Transformers next to building C-155 (AOC #16)		

Photograph: 44	Date: October 21, 1992	Taken By: Noushin Arab
Description: Transformer next to building W-47 (AOC #16)		

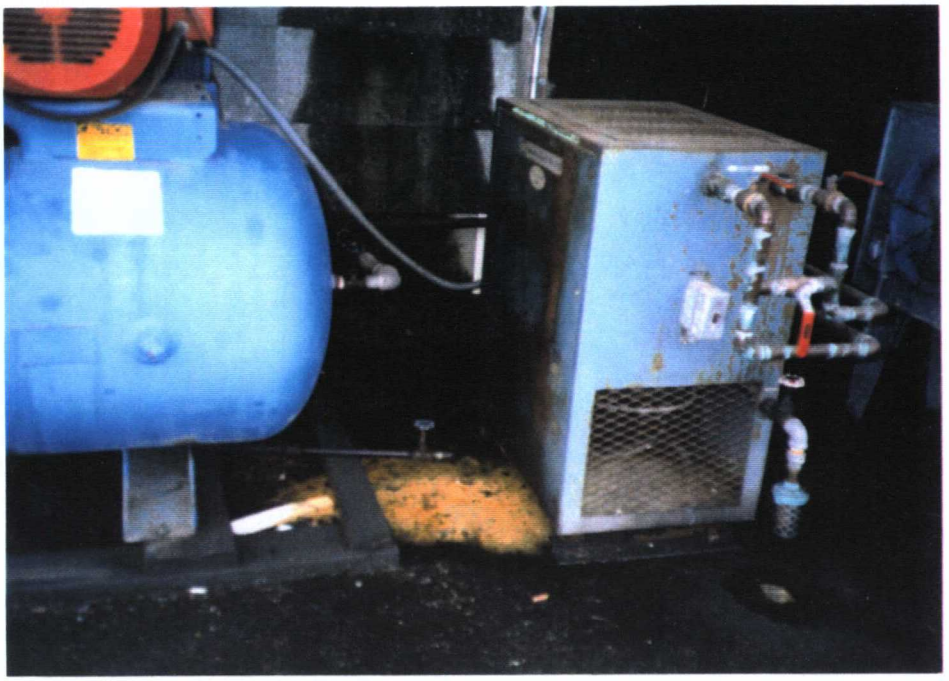
Photograph: 45	Date: October 21, 1992	Taken By: Noushin Arab
Description: Metal container outside building W-48, leased by Commercial Crating (SWMU 44)		

Photograph: 46	Date: October 20, 1992	Taken By: Noushin Arab
Description: Contaminated soil in the alley between Burlington and City Ice (AOC 1)		

Photograph: 47	Date: October 20, 1992	Taken By: Noushin Arab
Description: Dead bird in the alley between Burlington and City Ice (AOC 1)		



Photograph: 48	Date: October 20, 1992	Taken By: Noushin Arab
Description: Decommissioned pipeline parts on skid (AOC #3)		



Photograph: 49	Date: October 20, 1992	Taken By: Noushin Arab
Description: Generator next to a soil stain (AOC 4)		

APPENDIX C

MATERIAL SAFETY DATA SHEETS

COATING TRANSIT REMOVER KATS UL-7000

MATERIAL SAFETY DATA SHEET

2 0 2 0

SECTION I

PRODUCT NAME OR NUMBER (as it appears on label)
KATS UL-7000 WATER BASE DETERGENT TRANSIT COATING REMOVER

MANUFACTURER'S NAME
HANSON-LORAN CO., INC.

EMERGENCY PHONE NO.
(714) 522-5700

ADDRESS (Number, Street, City, State, Zip)
6700 CABALLERO BLVD. - BUENA PARK, CALIFORNIA 90620

MANUFACTURER'S D-U-N-S NO.
008489668

HAZARDOUS MATERIAL DESCRIPTION, PROPER SHIPPING NAME, HAZARD CLASS, HAZARD ID NO.
NON-HAZARDOUS

ADDITIONAL HAZARD CLASSES (as applicable)
NON-HAZARDOUS

CHEMICAL FAMILY
WATER BASE CLEANER AND DEGREASER

FORMULA
BLEND

SECTION II - INGREDIENTS

CAS REGISTRY NO.	%V	%V	CHEMICAL NAME(S)	LISTED AS A CARCINOGEN IN NTP, IARC or 1910(z) (specify)
9[illegible]36-19-5	10		Octylphenoxypolyethoxyethanol	Not listed
9004-82-4	6		Sodium Lauryl Ether Sulfate	Not listed
61790-63-4	5		Coco Diethanolamine	Not listed
N[illegible]ne	6		Sodium Isopropylnapthalene	Not listed
7[illegible]-92-9	5		B-Hydroxy-Tricarboxylicacid	Not listed
None	9		Phosphate Ester Potassium Salt	Not listed
7[illegible]64-41-7	4		Aqua Ammonia	Not listed
7[illegible]32-18-5	55		Water	Not listed

SECTION III - PHYSICAL DATA

BOILING POINT 212° F ___ C

SPECIFIC GRAVITY (H_2O=1)
1.1205

VAPOR PRESSURE
[illegible] F ___ C 20° ☐ mmHg ☐ psi

PERCENT VOLATILE BY VOLUME (%) 55%

PERCENT SOLID BY WEIGHT (%) 45%

VAPOR DENSITY (AIR=1) Heavier

EVAPORATION RATE (=1) Butylacetate = 1 Slower

SOLUBILITY IN WATER 100%

pH= 12.0

APPEARANCE AND ODOR Amber color with a cedar & ammonia odor

IS MATERIAL: (LIQUID) SOLID GAS PASTE POWDER

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT ___ F ___ C Method used Non-flammable

FLAMMABLE LIMITS: LEL _____ UEL _____

EXTINGUISHING MEDIA
Non-flammable

SPECIAL FIRE FIGHTING PROCEDURES
Non-flammable

UNUSUAL FIRE AND EXPLOSION HAZARDS
Non-flammable

LA-H 336

SECTION V – HEALTH AND HAZARD DATA

EFFECTS OF OVEREXPOSURE - Conditions to Avoid: Avoid contact with eyes. Avoid prolonged breathing of mist or vapor. Avoid prolonged contact with skin.

THRESHOLD LIMIT VALUE: ____

PERMISSABLE EXPOSURE LIMIT: Not established

OTHER LIMIT: ____

PRIMARY ROUTES OF ENTRY: Inhalation __ Skin Contact __ Other (specify) Swallowing: Do not induce vomiting. Give large quantities of milk or water. Seek medical attention.

EMERGENCY AND FIRST AID PROCEDURES: Skin contact: Remove contaminated clothing, flush skin w/water. Eye contact: Flush eyes w/large quantities of water for 15 minutes. Get medical attention. Inhalation: Move victim to fresh air and seek medical attention.

RECEIVED
APR 22 1991

SECTION VI – REACTIVITY DATA

STABILITY		CONDITIONS TO AVOID
	UNSTABLE	
	STABLE XX	Do not mix with other ingredients except water.

INCOMPATIBILITY (Materials to avoid): None

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS POLYMERIZATION		CONDITIONS TO AVOID
	MAY OCCUR ____	None
	WILL NOT OCCUR XX	

SECTION VII – SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Dike and contain spill. Transfer the liquid to containers for recovery. Dilute and flush remainder down drain.

WASTE DISPOSAL METHOD: Dispose in accordance with local and federal regulations.

CERCLA (Superfund) REPORTABLE QUANTITY (in lbs.): None

RCRA HAZARDOUS WASTE NO. (40 CFR 261.33): None

VOLATILE ORGANIC COMPOUND (VOC) (as packaged, minus water)

[ ] Theoretical ____ lb/gal [X] Analytical 1.674 lb/gal

SECTION VIII – SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type): None

VENTILATION		
	LOCAL EXHAUST (specify rate): Well ventilated area.	SPECIAL: None
	MECHANICAL (general - specify rate): None	OTHER: None

PROTECTIVE GLOVES (specify type): Rubber gloves

EYE PROTECTION (specify type): Safety glasses

OTHER PROTECTIVE EQUIPMENT: Rubber or neoprene boots

SECTION IX – SPECIAL PRECAUTIONS

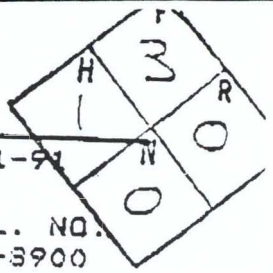
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Store in a cool, dry area with container tightly sealed.

OTHER PRECAUTIONS: None

NAME (print) Dale M. Cullop SIGNATURE Dale M. Cullop

TITLE Vice President DATE 7/12/90

METAL LUBRICANTS CO. MATERIAL SAFETY DATA SHEET



SECTION I

PRODUCT NAME OR NUMBER(as it appears on label) : DATE: 7-11-91
Aquacoat KW-11
MANUFACTURERS NAME : EMERG. TEL. NO.
Metal Lubricants Co. : (708) 333-8900
ADDRESS(Number,Street,City,State and Zip Code) : MFG.'s DUNS NO.
17050 Lathrop Ave., Harvey, IL 60426-6087 :
DOT HAZ. MATERIAL DESCRIPTION, PROPER SHIP. NAME, HAZ. CLASS & ID NO.
Flammable liquid, n.o.s.(isopropyl alcohol); Flammable liquid; UN1993
ADDITIONAL HAZARD CLASSES(as applicable)
OSHA hazardous; SARA 311,312; SARA 313(isopropyl alcohol)
CHEMICAL FAMILY : FORMULA:
Mixture : Proprietary

SECTION II - INGREDIENTS
(list all ingredients)

CAS #	%W	%V	CHEMICAL NAME	LISTED AS A CARCINOGEN?	TLV*
42884-82-2		8-13	copolymer	NO	NE
75169-84-5		0.1-3	copolymer	NO	NE
25973-55-1		0.1-3	UV absorber	NO	NE
52829-07-9		0.1-3	antioxidant	NO	NE
67-63-0		6-10	isopropyl alcohol	NO	NE
7732-18-5		75-85	water	NO	NE

* (1): OSHA TWA; (2) OSHA STEL; (3) OSHA CEILING; (4) ACGIH

SECTION III - PHYSICAL DATA

BOILING POINT
> 212 F ----- C
VAPOR PRESSURE: @
68 F - C < 25 mm Hg
VAPOR DENSITY (AIR=1)
ND
SOLUBILITY IN WATER
complete
SPECIFIC GRAVITY(H20 = 1) 1.0
PERCENT VOLATILE BY VOLUME (%) < 90
EVAPORATION RATE(=1)
ND
pH = ND
PERCENT SOLID BY WEIGHT (%) > 10
APPEARANCE AND ODOR: white, translucent liquid; mild odor

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 95 F
method used: TCC
FLAMMABLE LIMITS: LEL: NA UEL: NA
EXTINGUISHING MEDIA:
Foam, dry chemical and carbon dioxide fire extinguishers may be used.

SPECIAL FIRE FIGHTING PROCEDURES:
Wear self contained breathing apparatus in confined areas.
UNUSUAL FIRE AND EXPLOSION HAZARDS:
None

SECTION V - HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE-
May cause mild eye irritation, tearing and redness. Prolonged skin exposure may cause minor irritation and redness. Overexposure to mist may cause upper respiratory tract irritation. Ingestion may cause stomach discomfort, nausea and diarrhea.

HMIS RATING: 1 H; 3 F; 0 R; X PP

EMERGENCY AND FIRST AID PROCEDURES:
EYES: flush with clean water for at least 15 min. If irritation persists, contact a physician.
SKIN: wash thoroughly with water for at least 15 min., if irritation persists contact a physician.
INHALATION: remove victim to fresh air, if symptoms persist, contact a physician.
INGESTION: do not induce vomiting, give two glasses of water and contact a physician.

SECTION VI - REACTIVITY DATA

STABILITY:
UNSTABLE _____ STABLE __x__ :CONDITIONS TO AVOID: NA
INCOMPATIBILITY(materials to avoid):
Strong acids and strong oxidizers.
HAZARDOUS DECOMPOSITION PRODUCTS:
Oxides of carbon and incompletely burned hydrocarbons as fumes and smoke.
HAZARDOUS POLYMERIZATION:
MAY OCCUR _____ WILL NOT OCCUR __x__ :CONDITIONS TO AVOID: NA

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
Small spills: soak up with absorbent materials.
Large spills: dike & pump into drums for proper disposal.

WASTE DISPOSAL METHOD:
Dispose of in accordance with local, state and federal regulations.
CERCLA(Superfund)REPORTABLE QUANTITY(in lbs): NA
RCRA HAZARDOUS WASTE NO.(40 CFR 261.33): NA
VOLATILE ORGANIC COMPOUND(VOC)(as packaged,minus water):
_x_ Theoretical 0.65 lb/gal ___ Analytical _____ lb/gal

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION(specify type):
Approved MSHA/NIOSH respirator when TLV is exceeded.
VENTILATION:
General mechanical ventilation should be sufficient.
PROTECTIVE GLOVES(Specify Type)
Oil and chemical impervious.
:EYE PROTECTION(Specify Type)
:Chemical safety glasses

OTHER PROTECTIVE EQUIPMENT:
None

SECTION IX- SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

Store inside, away from extreme temperatures. Empty drums may contain product residue. All safety precautions taken when handling this product should also be taken when handling empty drums. Do not allow product to freeze.

OTHER PRECAUTIONS:

None known.

The information provided herein is believed to be accurate to the best of Metal Lubricants Co.'s knowledge as of the date of its issue. Metal Lubricants Co. does not warrant or guarantee the information provided and will not be held liable for any loss or damage from its use.

Prepared by:

Christian Bigelow
Health, Safety and Environmental Coordinator

APPENDIX D

VSI TRIP REPORT

APPENDIX D

VSI TRIP REPORT

VISUAL SITE INSPECTION

TRIP NOTES

OCTOBER 20-21, 1991

Dave Croxton, EPA; Noushin Arab, PRC; and Gwen Herron-Moon, PRC arrived at Burlington offices at Pier 91 at about 8:05 a.m. Present were:

Galen Tritt, Ecology
John Stiller, Burlington Environmental - Compliance
Ron Atwood, Burlington Environmental - Operations
Nathan Mathews, Burlington Facility Manager
Mike Brandeberry, Burlington Environmental (Attorney)
Julie Slocum, Burlington Compliance
Doug Hotchkiss, Port of Seattle
George Markwood, Pacific Oil
Tom Newlin, Port of Seattle (attorney)
Arrived later:
Sue Roth, Kennedy-Jenks (Contractor to Port)
Marlys Palumbo, Burlington (attorney)

The PRC ream reviewed the notification letter requests with those present. Started with a facility tour of Burlington Environmental Inc. at approximately 9:45 am.

Viewed the oil/water separator identified as SWMU 2. This separator has been closed since 1990. It is a below ground tank. It is currently covered and waiting for corrective action to occur subject to the RFI that is being conducted at Burlington.

The hazardous waste tanks are bermed from the other tanks. The catchment basins in the HW area is sealed, water or whatever accumulate in the basins are pumped to holding tanks prior to treatment in the waste water treatment system.

The team viewed the inoperable sludge decanter in the small yard. It was covered and located across the yard from the area where the barrel washing occurred. Also in this area was a contractor storage shed containing odds and ends including a small drum of something labelled dangerous waste. [Edit Note: Commenters remarked that the drums contained bentonite and drill cuttings from investigation activities.]

Across from the API separator was an area previously used for barrel cleaning operations. The cleaning operations stopped sometime in the 1970s. The area is paved over now. The separator is a now unused. It is unknown whether the API separator is empty now or whether there have ever been any leaks from it.

Returned past centrifuge to the boiler room where PANOCOs boiler is located. Looks like an insulated boiler with some of the insulation starting to pull away.

The boiler burns residual fuels (i.e. Bunker fuel) and generates steam which is used to heat the oil tanks. The tanks (really the oil) must be kept at a certain temperature (the temperature depends on what kind of oil it is and where it came from) to keep it a low viscosity.

Adjacent to the boiler room is a drum storage area. This room stores hazardous waste for less than 90 days and is also a product storage room this is SWMU #1 in the Tetra Tech RFA.

On-site rain water is collected in tanks and treated (probably by separation) prior to discharge.

After lunch the VSI team began the tour with inspecting additional storage areas beneath the freeway. Under the freeway was a petrol powered generator and lots of odds and ends. The team came across a small locked building which turned out to house a water main. It is next to the new substation. Much of the area beneath the freeway is used as a marine maintenance area with a tank of diesel, two trailers, and stacks of tires.

Next the team viewed PANOCO's hydrocarbon recovery system. This system has a Metro discharge permit. This system removes diesel from the groundwater that was spilled from an unknown source. PANOCO has the source narrowed down and has stopped using the suspect piping. Pipe was cleaned out. When the discharge was noticed the piping system was hydro tested. The recovery system screens off the diesel which is reused. There is no storage of waste oil because the diesel is pumped directly back to the PANOCO diesel tanks for reuse. Any oil collected during transfer by drippings is sucked back into the PANOCO tanks. Groundwater monitoring is done once a year from wells on the fill area between L. Jacobs and Puget Sound.
[Editor Note: Commenters remark that the recovered oil is not pumped directly to PANOCO; rather, it is stored in drums at the recovery location.]
All storm water on the berm is discharged through outfalls.

Team peered inside the locked Navy boiler room. Windows were dirty and room dark so it was hard to see inside. Although room looked messy.

Out on the pier was another electric vault near the fruit truck area it was approximately 5 feet by 5 feet and 15 feet deep with a grate over the opening.

Entire pier is asphalted.

Pier is being repaired and widened by the port. At least two piles of construction debris with lots of wood piling.

Team reversed steps to cross fill area and go from Pier 90 to 91. On the way back team viewed two storm drains discharging to the sound. In addition to the outfall pipes there were several additional pipes protruding from the rip rap but not discharging.

The team also came upon several drums (~6). Drum labels signified that non-hazardous petroleum contaminated soil was contained in the drums. Some of the drums were on pallets, others on the concrete, and 3 did not have lids.

The ammonia release referred to in the PAR occurred in the first building on Pier 91.

Next the team came across one of the fuel blending stations that blends fuel to a particular specification according a ships preference. A catch basin is beneath the piping. The pan drains to a sump which according to Burlington the accumulation is pumped out and gets treated at Burlington. There is a small area on one side of the area where there appears to be a sheen on the asphalt.

CITY ICE LEASED BUILDINGS

Building M-28

Leased by City Ice and Cold Storage occupied by Independent Packers who repackage fish for sale. VSI team did not enter this area of the building. Spoke to company owner Bill Manning outside of building 40.

This information was told to us by City Ice representatives. Portion of the building is occupied by the City Ice forklift recharging area. This is where the battery run forklifts are recharged. Batteries when spent are traded in for new ones. Some of the areas near the battery recharging had some kind of liquid or oily film on the floor where the forklifts parked while recharging. Outside of battery recharge area beneath the highway was found an abandoned apparently used battery and some empty drums.

Building W-39

Leased by City Ice and Cold Storage for storage of frozen product. The refrigeration system in this building is mostly a brine system with the refrigeration mechanism of ammonia. The cooled ammonia cools the brine which runs through pipes in the building to cool the rooms. Less than 300 gallons of waste oil every couple of years in generated from the cooling system. This oil results from small releases that are caught in pans or buckets and periodically emptied into a larger bucket in the area. This is then poured into a barrel container outside of the building in the maintenance area. This oil is generated through routine maintenance of the system. United Drain comes to pick up the waste for reprocessing. This building also has a small maintenance area with one parts washer unit leased from Safety-Kleen. A red oil collection tank is stored in this room. The refrigeration unit inside looked well maintained.

Buildings W-390 and B-391

Leased by City Ice. Also used for cold storage of frozen product. Part of W-390 is also City Ice and Cold Storage offices.

These refrigeration units are newer than in building W-39 and are strictly ammonia refrigerators. Apparently the way the system is set up if a release of ammonia resulted no more than 100 lbs could be released in 24 hours.

Building B-392

Leased by City Ice used by Arctic Alaska. Arctic Alaska a fish processing company that repackages frozen fish products. Storage and processing also done by Arctic in Building W-40. B-392 is strictly cold storage.

Spoke with Allen Mitchell of Arctic Alaska. Uses batteries for running forklifts. Trade in spent batteries when buying new ones. Fish waste is sent to a fish vender. City Ice services the refrigeration systems in Building B-392 and W-40.

Conveyers are electricity driven also use of hydraulic pumps.

Building W-40

Leased by City Ice used by Arctic Alaska and Independent Packers for processing and some cold storage. Additional information under B-392.

Building W-47

City Ice Leases. One of two buildings that is designated for demolition in 1993. Currently this 50,00 square feet warehouse houses a number of difference storage products from some undetermined businesses and one active business in the warehouse.

Pacific Rim Consultants conduct steel fabrication which includes welding and apparently some priming. Company owner denied doing any priming onsite but Dave Croxton of EPA observed wet steel girders that appeared to be freshly primed.

In the City Ice area of Building W-47 the main area is filled with pallets and pallets of smelly fish meal. On the south side of the warehouse on the outside of the building the VSI team viewed 16 drums, some empty some labelled paint wastes, or gas, one labelled transformer oil. The paint waste drums did not seem to be empty. Also observed several old abandoned cars and addition drums (12) secured behind chicken wiring labelled concrete curing. There were also some old propane tanks.

Area adjacent to fish meal room indoors the VSI team 2 or 3 drums containing unknown wastes some stacked on pallets. Eight drums of product motor oil on pallets. Twenty-four 1-gallon jugs of inhibited mineral acid. Three 5-gallon drums of mineral thinner. Danger combustible - said label. A transformer box. And 4 more drums in dark side of room - couldn't read label.

Outside of Building W-47 were approximately 8 portable processing tanks of some kind (north end of Building). White tanks. Didn't appear to contain anything nor was there any leakage beneath the tanks.

Outside of W-47 between W-47, and W-48 behind a wire cage were three apparently inactive transformers (TB #1). Sue Roth from Kennedy-Jenks was going to check into these.

Building W-48

Leased by Commercial Crating and various other small organizations. On the north end of W-48 is Commercial Crating a wooden box and crate construction outfit. Lots of stacks of wood, plenty of it in disarray. Looks like a nice fire hazard. Some sort of shed out front with a big barrel as small tank collecting liquid. Some containers say flammable waste. Lots of other disrepair or containing hazardous waste perhaps. The manager would not let us in to look around. For insurance purposes he said. Around the side, between buildings W-47 and W-48 across from the transformers was a drum storage area with about 24 drums on pallets. Most of them appeared to be empty. Some of the drums were labeled with diisocyanate.

The south end of the warehouse is used for storage by a number of different parties of a variety of material. Seafair stores props in here. An organization for retired people stores old furniture here. In the Seafair area there were about 30 empty drums neatly stacked. Use unknown.

Buildings W-158, W-155, and W-154

These buildings leased by Distribution Auto Services (DAS) is used primarily to process and store imported automobiles. DAS uses the short fill area, located next to Lake Jacobs to park the cars and trucks once they disembark from the ships.

DAS also leases property at the north end of Terminal 91 to wash, apply protective coatings, repair, paint, and install additional items into the vehicles. West of Building W-158 is an automobile spray system. This spray system consists of an inverted U-shaped pipe through which water is pumped. Water is sprayed from holes on the inner side of the U-pipe on to cars and trucks as they drive through. This is an initial wash station intended to remove dirt and dust. Water from the spray station flows in a stream along the asphalt to the storm drain. Building W-158 is considered the car wash station. In one half of Building W-158, DAS employees remove expired aquacoating from vehicles with detergent. Aquacoating is an environment protection coating that must be removed and reapplied every 90 days. In the second half of Building W-158 a new coat of aquacoating is applied. Sudsy washwater from the first half of the building was observed running out an open door to a storm drain.

In Building C-154 accessories such as alarms and CDs are installed. Minor maintenance of the vehicles also occurs in this building, maintenance largely consisting of oil changes. DAS generates ten 55-gallon drums of hazardous waste a year.

The VSI team conducted a brief exit interview with the remaining Burlington representatives. This discussion explained how the rest of the RFA process worked. John Stiller asked if they could see a draft copy of the report. The VSI was concluded at approximately 4:30 p.m.